Introduction to Lake Whatcom

Lake Whatcom and its Watershed
Map & information about Lake Whatcom — City of Bellingham

Stewards of the Lake
Booklet- Report on Lake Whatcom — City of Bellingham

Consumer Confidence Report
Drinking Water Report — City of Bellingham

Consumer Confidence Reports
Drinking Water Reports — Lake Whatcom Water and Sewer District
Agate Heights, Eagleridge, Qmsrf Qfmpc

Lake Whatcom TMDL: Maximum Pollutant Loads
Brochure — Lake Whatcom Cooperative Management

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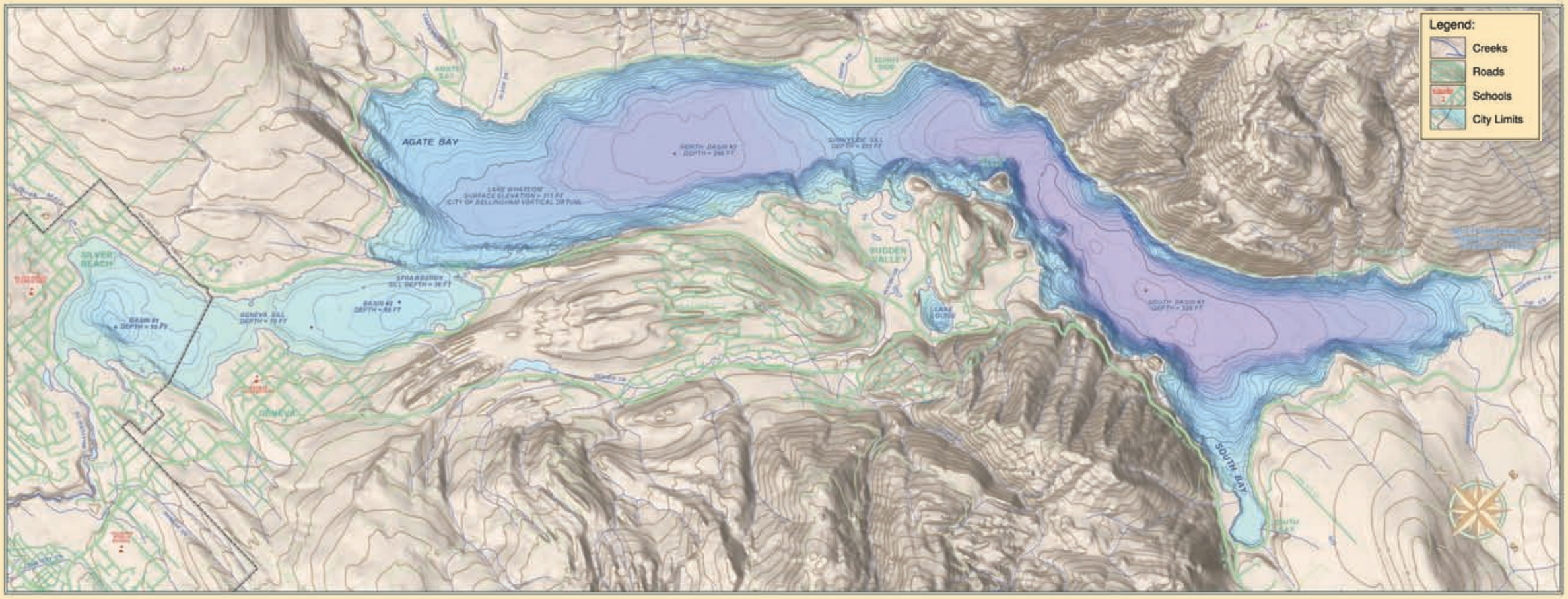
Lake Whatcom

and its

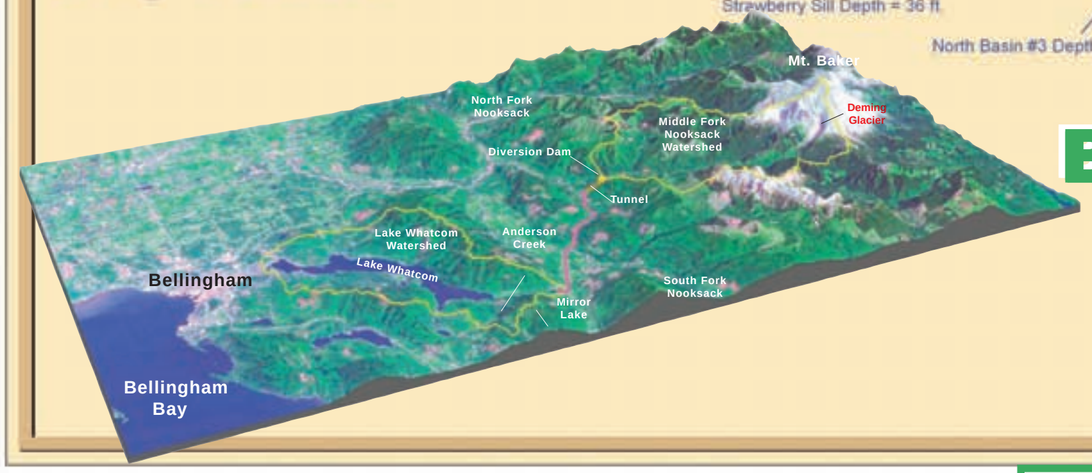
Watershed

Tore Ofteness Photographer

Whatcom County
Washington



LAKE WHATCOM



Bellingham's Water System

Mt. Baker to Bellingham Bay

SCALE 1:12,000

0 0.25 0.5 0.75 1 Miles

0 0.25 0.5 0.75 1 Kilometers

A Journey from Mountain to Tap

A watershed is an area of land where water drains from the highest point and collects in the lowest point. All of the water (rain, snow, fog) that falls in the Lake Whatcom Watershed eventually flows into the lake in one of the seven year-round streams, several seasonal streams, ground water flow, or directly into the lake.

Lake Whatcom also receives water from the Middle Fork Nooksack River Watershed that includes the Deming Glacier on Mt. Baker. From a diversion dam on the Middle Fork Nooksack River, the City periodically diverts some of the flow from the river into a tunnel that runs 8900 feet through Bowman Mountain. When needed, a gate is opened at end of the tunnel, using an automated remote system, allowing water to flow into a pipe that runs under the Acme Valley, into Mirror Lake, down Anderson Creek, and into the south end of Lake Whatcom.

Water is taken out of Lake Whatcom, through a 1200 foot wooden pipe that leads to a screenhouse in Whatcom Falls Park. In the screenhouse, large screens catch floating debris before the water continues to the water plant for treatment. An automated control dam near Basin 1 is operated remotely to manage the lake level and the amount of water leaving the lake, flowing down Whatcom Creek and into Bellingham Bay.

Citizens, businesses and industries in Bellingham and beyond consume an average of 10 million gallons of water a day.

Lake Whatcom Water and Sewer District also uses Lake Whatcom (Basin 3) to supply customers in Sudden Valley, Geneva and Eagleridge.

The Natural Ways of a Watershed

Evapo-transpiration

Evapo-transpiration is a combined process of evaporation from soil and plant surfaces and transpiration through plant canopies. In the evapo-transpiration process, water is transferred from the soil and plant surfaces into the atmosphere in the form of water vapor. The amount of water lost by a plant depends on its size, the surrounding temperature, humidity, and wind speed. A fully-grown tree may lose several hundred gallons of water through its leaves on a hot, dry day. On a summer day in the Lake Whatcom Watershed, up to 20 million gallons of water is transferred to the atmosphere through this process.

Stratification

Stratification is a layering effect produced by the warming of the surface waters in Lake Whatcom during summer. Upper waters are progressively warmed by the sun and the deeper waters remain cold. Because of the difference in density (warmer water is lighter), the two layers remain separate from each other: upper waters "float" on deeper waters and wind-induced mixing occurs only in the upper waters. Oxygen in the bottom waters may become depleted. In autumn, as the upper waters cool, the whole lake mixes again and remains mixed throughout the winter.

Nutrient Loading

Nutrients, such as nitrogen and phosphorus, occur naturally in water, soil and air. They stimulate plant growth. These nutrients are essential for animal and plant life. Natural amounts of nutrients promote a natural level of growth, but excessive amounts of nutrients in the lake can promote excessive amounts of algae growth. This overgrowth of algae can cloud the water and block sunlight from other plants and aquatic life, killing them or limiting their growth. The bacteria that feed on decomposing algae use up the oxygen in the water, thereby reducing the oxygen available to support aquatic life.

Then and Now

From 1906 until 1919, the **White City amusement park** stood on the northern shore of Lake Whatcom, in today's Silver Beach neighborhood. Houses and businesses now stand on what used to be the most popular stop on the motorcar ride around town. Attractions included a roller coaster, ferris wheel, merry-go-round, dance hall, ice cream parlor and the Silver Beach Hotel.

Peter Larson, J. H. Bloedel and J. J. Donovan, established the Larson Lumber Company's sawmill, "Mill A," in 1901. After Peter Larson's death in 1907, the company became the Bloedel Donovan Lumber Mills Co. By 1909, the "Larson Mill" had grown into a sprawling complex of four mills, dry kilns, lumberyard and a small town (known as "Larson") of company buildings and workers' houses. The Mill A site was donated to the city in 1946 and today is part of Bloedel Donovan Park.

Managing stormwater in the Lake Whatcom watershed has always been a challenge, as evidenced by this photo of the Smith Creek flood of 1953. Pesticides, fertilizers, gas and oil from automobiles, and animal waste are washed into Lake Whatcom when it rains. Stormwater management facilities, like this rain garden near the boat launch at Bloedel Donovan Park, help slow down the flow of rain water, removing pollutants before it enters the Lake.

The first logging in the Lake Whatcom Watershed began in 1898 by 18 men with a horse. Year in and year out, for half a century, the mills and logging camps worked to convert all of the raw material of the forests into useful products, payrolls, and growing communities. Today, approximately 80% of the watershed is comprised of forestlands, largely surrounding Sub-basin Three. Logging continues but with far less impact than in the past.

Photos courtesy of Whatcom Museum of History and Art

LAKE WHATCOM

Contacts & Resources

Mayor Dan Pike	778-8100
City Council	778-8200
Public Works Department	
Administration/Engineering	778-7900
Operations Division	778-7700
After hours/emergency	778-7705
Finance	778-8000
Parks & Recreation	778-7100
Recycling Hotline	676-5723
Whatcom Transportation Authority	676-7433
Disposal of Toxics	380-4640
Whatcom County Water Resources	676-6876
Whatcom County Health Dept.	676-6724
Lake Whatcom Water & Sewer District	734-9224

CITY OF BELLINGHAM

210 LOTTIE STREET, BELLINGHAM, WA 98225

www.cob.org

- Reduce fertilizer & pesticide use
- Bag and throw your pet's waste in the garbage
- Landscape with native plants
- Maintain your car & fix fluid leaks
- Combine errands to drive less
- Don't feed ducks & geese
- Reduce motorboat use on the lake

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Lake Whatcom Management

The Lake Whatcom Reservoir Management Program is a joint effort of the City of Bellingham, Whatcom County, and Lake Whatcom Water and Sewer District (formerly Water District 10) to protect Lake Whatcom as a source of drinking water for over 85,000 county residents.

Lake Whatcom Management Questions

City Contact: Clare Fogelsong
(360) 778-7900, cfogelsong@cob.org

County Contact: Jon Hutchings
(360) 676-6692, jhutchin@co.whatcom.wa.us

District Contact: Jim Neher
(360) 734-9224, jimneher.wd10@comcast.net

Protect the Treasure

Lake Whatcom provides an abundant source of drinking water for over half the people in Whatcom County. This precious resource depends on the care and commitment of each of us who live in the Lake Whatcom watershed, use the lake for recreation, and drink the water it provides. It's the cumulative effect of all our actions that can either help or harm the water quality in Lake Whatcom. Consider what you are willing to do to ensure the future of this natural treasure.

A CITY *of* BELLINGHAM GUIDE *to the* LAKE WHATCOM WATERSHED

STEWARDS OF THE

Lake

SPRING 2007

*This report is dedicated to the memory of Bellingham City Council member **Joan Beardsley**, who helped initiate its creation before her death on March 12, 2007. Joan was a long-time Bellingham resident, a much-loved and respected educator, and a thoughtful, engaged community leader. May her passion for the environment and public service continue to inspire us all.*

Lake Whatcom is the source of drinking water to some 95,000 people in Whatcom County, including the 82,000 served by the City of Bellingham. The health of this tremendously important resource is declining, and at a pace that is faster than expected.

Local governments are working hard to study the lake and make wise decisions about its future. We have made Lake Whatcom protection efforts a top priority for 2007, and will consider rigorous steps to protect our lake. These steps will include protecting more undeveloped land in the watershed, improving stormwater treatment, and helping watershed residents become better stewards of the lake.

Protecting Lake Whatcom is our responsibility, not one we should leave to our children or grandchildren. There is no magic wand, there's just us. We know the lake is changing, and for each day, each month, each year we delay, it will take another day or month or year to bring our lake back to health. Let's get the job done.

Tim Douglas
Mayor of Bellingham

Nootka rose
(Rosa nutkana) is native to Washington.

W O R K I N G T O G E T H E R T O P R E S E R V E A N D

STEWARDS OF THE *Lake*

Why is the City publishing this report?

Lake Whatcom, precious community treasure and drinking water reservoir, spans several jurisdictional boundaries — the City of Bellingham, Whatcom County and the Lake Whatcom Water and Sewer District.

Human activities along the shores and on the surface of Lake Whatcom have a profound impact on the lake, and these three jurisdictions have teamed up over the years to study, to manage, and to protect it. This partnership is essential to the long-term health of the lake and we appreciate the dedication of our agency partners and the citizens they represent.

Yet the City of Bellingham has a special responsibility to Lake Whatcom. Our city has for decades hosted dense population on its northwestern shoreline. Our city thrives on the drinking water we draw from the lake and are responsible for delivering to 82,000 residents. And our city prides itself as a national leader in environmental stewardship and innovation.

As the health of Lake Whatcom declines, city residents have a special responsibility to preserve this resource. City officials are calling on Bellingham residents for support of continuing and new government programs, and changes in individual actions, to protect the lake.

This report is designed to help you understand the challenges we face as we work together to preserve and enhance Lake Whatcom.

ENHANCE LAKE WHATCOM

WHAT'S INSIDE

How has Lake Whatcom changed?

Lakes change slowly.

Only in the past decade or so has the quality of the water in Lake Whatcom started to change noticeably, in response to more than a century of development on its shores.

The Washington State Department of Ecology was concerned enough about algae growth in Lake Whatcom, in 1998, to place the lake on the state list of water bodies that fail to meet water quality standards. That listing, required under the federal Clean Water Act, triggered a mandatory water quality improvement plan. (For details, see pages 14-17.)

Lake Whatcom was listed because of low levels of dissolved oxygen, which are the result of an explosion of algae growth. Phosphorus carried into the lake by stormwater runoff is the primary cause of the algal growth and low levels of dissolved oxygen.

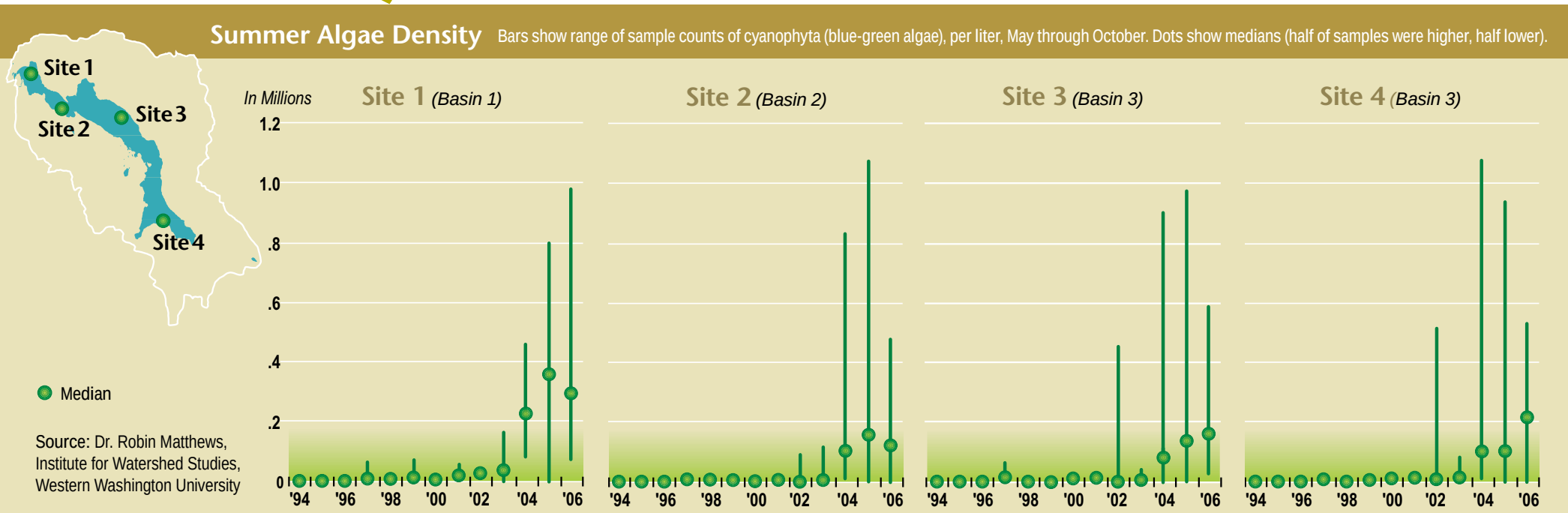
Phosphorus flows into the lake from sources including stream bank erosion; exposed soil from construction, landscaping and logging; lawn fertilizers; leaves and grass clippings; pesticides; pet and wildlife droppings; failing septic systems; sewage spills and leaking sewer pipes; and phosphorus-based soaps, detergents and chemicals.

Since 2004, the growth of algae and the drop in dissolved oxygen have become even more dramatic, and more widespread. All four of the major algae groups have increased, but the most striking increase has occurred in cyanophyta, known as blue-green algae (although cyanophyta are actually bacteria).

The changes started adjacent to the most urbanized parts of Lake Whatcom, the Silver Beach and Geneva neighborhoods, and have spread past the intake pipe for Bellingham's water supply in Basin 2, past Sudden Valley, and all the way to the south end of the lake.

Lakes change slowly. We aren't yet seeing the full effects of the phosphorus we're allowing to flow into the lake today. The full effects of today's phosphorus loading — on dissolved oxygen levels and algae growth — won't be seen for years to come.

WATER QUALITY HAS DECLINED THROUGHOUT THE LAKE AND



Human behavior changes slowly, too, sometimes as slowly as lakes.

It's hard to change our habits — what we build, the sort of yards we plant, how we get around town, how we care for our pets, how we clean our cars, what kind of boats we use.

But Lake Whatcom is changing. If we want to slow or halt the lake's changes, we will have to quicken the pace of our own.

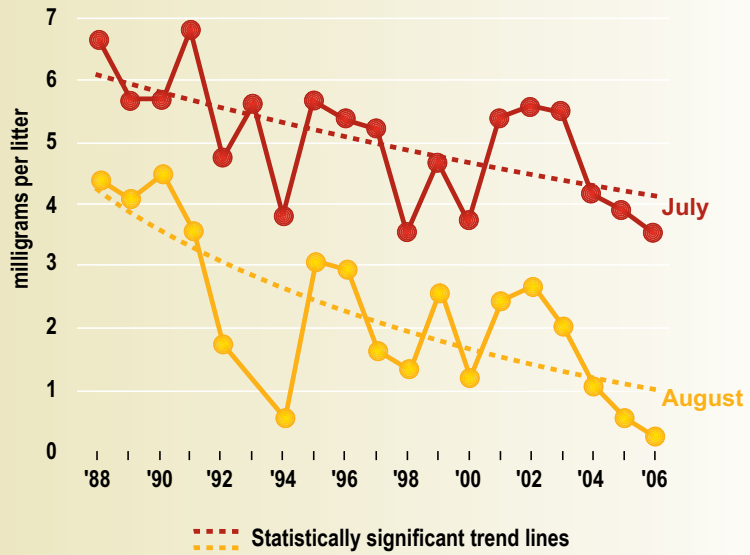
What's wrong with algae?

Decaying algae deplete oxygen supplies needed by fish and other aquatic life. Algae also cause water to taste and smell bad, and can cause health problems.

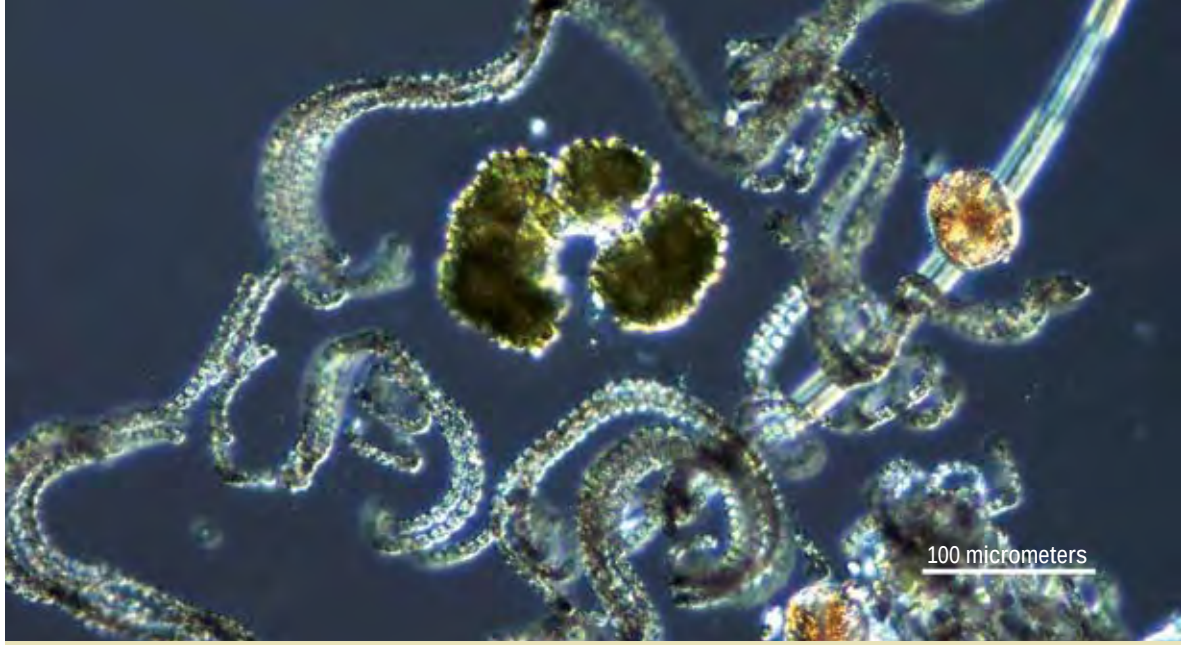
IS GETTING WORSE

Dissolved Oxygen in July and August

Dissolved oxygen, measured at Site 1 at a depth of 12 meters, in milligrams per liter of water.



ROBIN MATTHEWS



WHAT DO I NEED TO KNOW ABOUT ALGAE, DISSOLVED OXYGEN AND PHOSPHORUS?

When too much phosphorus is introduced into a water body like Lake Whatcom, some plant species, such as algae, experience explosive growth. Overgrowth of algae can cloud water, blocking sunlight from other plants and aquatic life, killing them or limiting their growth.

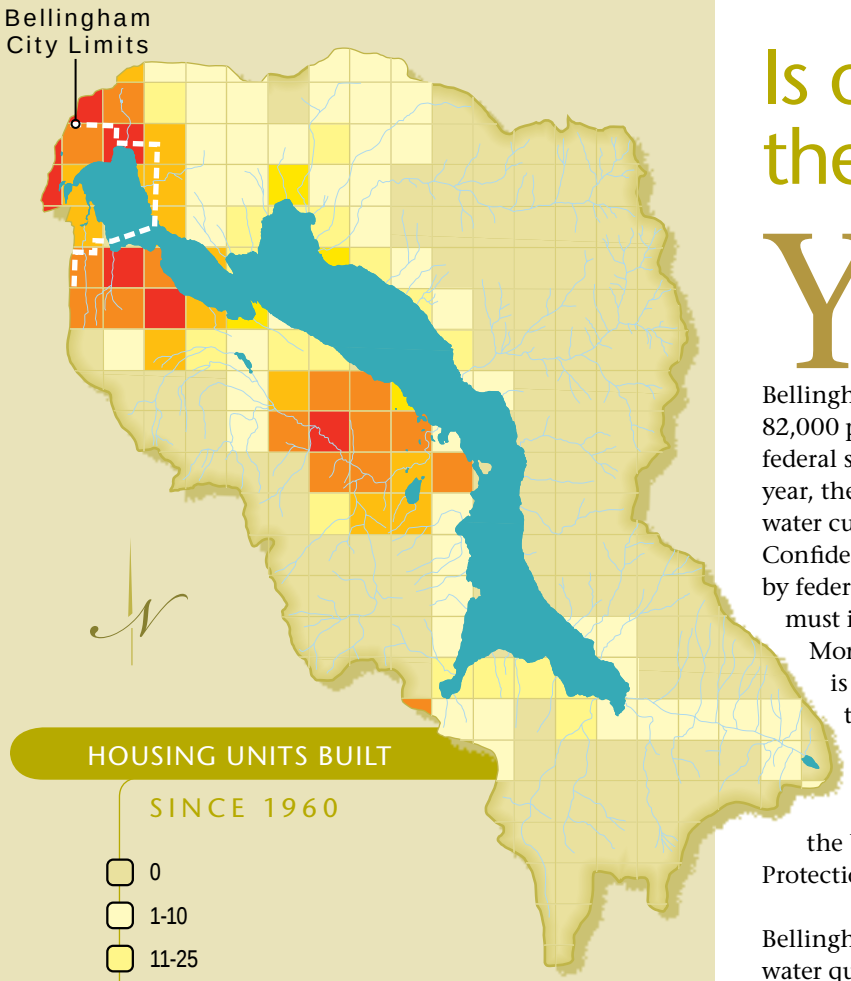
When algae die, they sink to the bottom of the lake and begin to decompose. Bacteria feed on the decomposing algae and consume oxygen in the water. The bacteria deplete the supply of dissolved oxygen needed by fish and plants. In addition, dead algae create more nutrients that fertilize even more algae growth, accelerating the depletion of oxygen in the lake.

Low oxygen levels cause sediments on the bottom of the lake to release mercury, which is then absorbed by fish, and phosphorus, which stimulates the growth of even more algae.

Phosphorus is a naturally occurring nutrient, found in water, soil and air. It helps stimulate plant growth and is essential for animal and plant life. You may recognize it as a common ingredient in fertilizer.

But there can be too much of a good thing. Naturally balanced levels of phosphorus promote natural levels of growth. Human activities are increasing phosphorus levels in the lake. Scientists can't tell us which activities are loading the most phosphorus into Lake Whatcom, but we know sources include:

- Stream erosion.
- Exposed soil from construction, landscaping and logging.
- Lawn fertilizers.
- Leaves and grass clippings.
- Pesticides.
- Pet and wildlife droppings.
- Failing septic systems.
- Sewage spills and leaking sewer pipes.
- Phosphorus-based soaps, detergents and chemicals.



For a long period of time, the overall quality of the water in Lake Whatcom appeared to be impervious to our impacts on its shores. This period is over.

Is our drinking water safe, even though the pollution is getting worse?

Yes. Bellingham has great drinking water.

The drinking water the City of Bellingham pipes to about 82,000 people far exceeds federal safety standards. Every year, the City mails to every water customer a Consumer Confidence Report, as required by federal law. That report must include Water Quality Monitoring Results, which is a table showing how the treated water that reaches your home compares to maximum levels of contaminants set by the U.S. Environmental Protection Agency.

Bellingham also meets a higher water quality standard, set by the Partnership for Safe Water, an alliance that includes American Water Works Association and the U.S. Environmental Protection Agency. Bellingham voluntarily joined the Partnership. This higher standard limits the concentration of particles larger than two microns left in our drinking water after treatment.

Bellingham's drinking water is safe, but algae growth in Lake Whatcom is making our water less appealing and is requiring more expensive treatment to keep it safe.

Taste and smell

Our drinking water usually tastes great; in fact, it has even won awards for taste. Some customers tell us the water tastes different in warmer months. In late summer, when algae growth is at the highest in Lake Whatcom, algae and tiny fungi can give off non-toxic but smelly chemicals that can cause unpleasant tastes and odors in our drinking water. Also in late summer, our drinking water might smell like chlorine, even though the City has not changed the level of chlorination in decades. The chlorine smell is caused by a reaction between the chlorine used in treatment and algae in our source water.

Health

The more algae there are in our source water, the more the algae react with chlorine during treatment. This reaction causes byproducts, including trihalomethanes (often called THMs), which increase cancer risk. The level of THMs in Bellingham's drinking water has never approached the Maximum Contamination Level set by the U.S. Environmental Protection Agency — 80 parts per billion. But late summer levels started rising around 1998. The highest detected sample — 49 parts per billion — was collected in 2004.

Switching to a different disinfectant is not the solution, because alternatives to chlorine may also create harmful byproducts and can't fully substitute for chlorine. Instead, in April 2005 the water treatment plant added a new treatment chemical to the pre-filtration process.

Adding a different polymer boosted the power of the coagulants, so organic matter would form larger clumps and the plant's filters would catch more organic matter before chlorine is added to the water. By lowering the concentration of algae leaving the filtration step of treatment, we lowered the amount of chlorination byproducts.

September levels of THMs tend to be highest, but by 2006 the September averages had dropped below every September average since 1997.

However, this approach of using a polymer to boost coagulation has its limits, and if algae density in the lake continues to increase, THM levels are likely to increase again.

Expense

If algae and other organic matter in the source water continue to increase, Bellingham will be compelled to upgrade our treatment system.

Our in-line filtration plant was built in 1968. It has since been computerized and improved in many ways. In 2007, the original clay underdrains will be replaced with stainless steel, to allow more room for additional filter materials.

Our current filters remove particles larger than 2 microns. Of those, the City's target is to leave no more than 20 particles per milliliter of water (which matches the target of Partnership for Safe Water).

Newer systems, employing different treatment techniques, are capable of removing much smaller particles and reducing the amount of organic material left in the water. Examples include membrane filtration, in which less organic matter is present when chlorine is added, so less THM is produced.

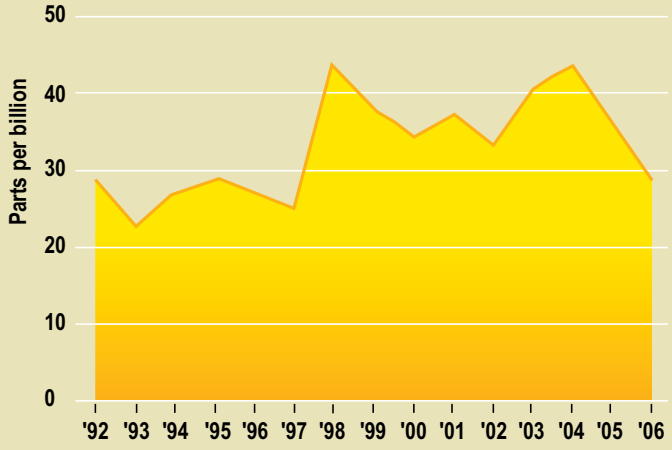
Another approach is to use alternative disinfection methods such as ultraviolet light or ozone, which reduce the amount of chlorine necessary, thereby reducing the amount of chlorine byproducts, including THMs.

The cost of upgrading our drinking water treatment system to handle smaller particles is estimated in the millions of dollars, depending on the technology selected.

Water treatment professionals talk about the three-legged stool that supports high-quality drinking water: Protect source water, optimize treatment and take care of the distribution system. The money we spend to clean up Lake Whatcom, our source water, can postpone or reduce the cost of upgrading our system for treating drinking water.

DAVID SCHERRER

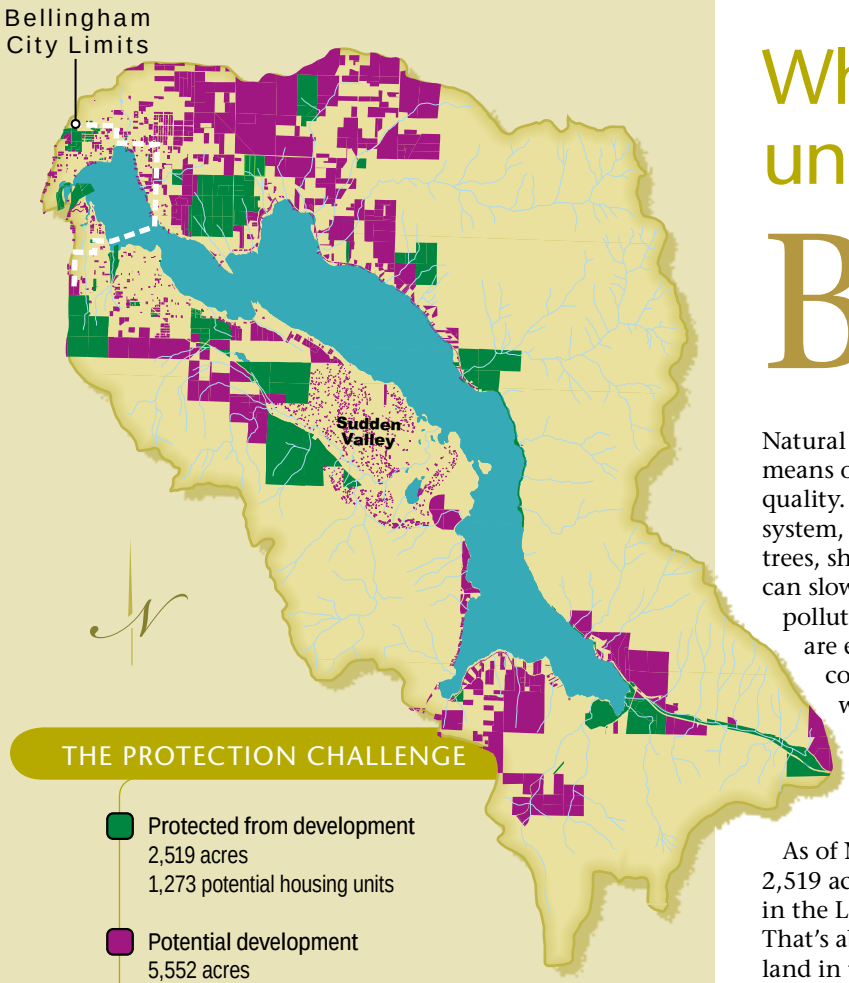
LOWER THM LEVELS



Adding a new polymer to the City's method of treating drinking water, in 2005, is thought to be how an upward trend in disinfection byproducts was reversed.

September average levels of trihalomethanes (THMs). The federal limit is 80 parts per billion.

Source: City of Bellingham Department of Public Works



THE PROTECTION CHALLENGE

Protected from development
2,519 acres
1,273 potential housing units

Potential development
5,552 acres
3,208 potential housing units

Development of the watershed creates a four-fold challenge, from:

1. Land disturbance
2. Loss of forest cover
3. Urbanization and increased impervious surfaces
4. Contaminants from daily activities

Why is the City of Bellingham buying undeveloped land in the watershed?

Because science indicates that preventing property from being developed is the best way to protect Lake Whatcom.

Natural forest cover is the best means of protecting water quality. This finely balanced system, with its canopy of trees, shrubs and groundcover, can slow rainwater and filter pollutants. Because forests are essential in providing a continuous supply of clean water, control of the land is one very effective way to achieve beneficial, enduring results.

As of March 1, 2007, a total of 2,519 acres have been protected in the Lake Whatcom Watershed. That's about 31 percent of the land in the watershed that's zoned for development but remains undeveloped, or about 8 percent of the total land in the watershed.

This has been accomplished through the efforts and financial contributions of the City of Bellingham, Whatcom County, Sudden Valley Community Association, Lake Whatcom Water and Sewer District, Whatcom Land Trust, Washington State Department of Natural Resources and generous individuals. It is estimated that these protections are preventing the construction of 1,273 houses in the watershed.

But enormous challenges remain:

- Under current zoning, about 3,208 more single-family houses could be built in the watershed, on 5,552 acres of undeveloped land. At the current rate of construction — about 270 homes per year — the remaining developable land in the watershed will be fully built out in about 12 years.
- Although 2,519 acres are protected, some of these parcels are not permanently protected from development.

Bellingham's Lake Whatcom Watershed Property Acquisition Program has played a major leadership and financial role in the partnerships that have been forged to protect watershed land.

How watershed land is protected from development

Protected by	Acres
City of Bellingham Lake Whatcom Watershed Property Acquisition Program ownership	773
City of Bellingham Lake Whatcom Watershed Property Acquisition Program and Whatcom County joint ownership (Whatcom Land Trust conservation easements on all 405 acres)	405
City of Bellingham ownership for parks, greenbelts, stormwater detention, drinking water facilities, etc.	259
City of Bellingham conservation easements with private entities	104
Whatcom County ownership	318
Washington State Department of Natural Resources ownership, with Whatcom County management plan	139
Whatcom Land Trust ownership, with Whatcom County easement and management plan on 212 acres	349
Whatcom Land Trust private conservation easements	75
Sudden Valley Community Association ownership through joint purchase and donation by City of Bellingham, Whatcom County and Lake Whatcom Water and Sewer District	60
Sudden Valley Community Association ownership	37
TOTAL	2,519

Progress Report: City of Bellingham Lake Whatcom Watershed Property Acquisition Program

The City of Bellingham began a program to purchase land in the Lake Whatcom Watershed in 2001, in order to protect our drinking water source. The program is financed by water usage fees. A single-family residence pays $5 a month, which is included in City water bills.

As of March 1, 2007, the program has been involved in buying approximately 1,178 acres of land, with purchase prices totaling about $16 million dollars. Whatcom County, Whatcom Land Trust and generous landowners assisted in these protections. The program was also involved with partners in protecting an additional 164 acres, through conservation easements and covenants.

Altogether, this program has participated in the protection of 1,342 watershed acres. This acreage is about 53 percent of the protected land in the Lake Whatcom Watershed.

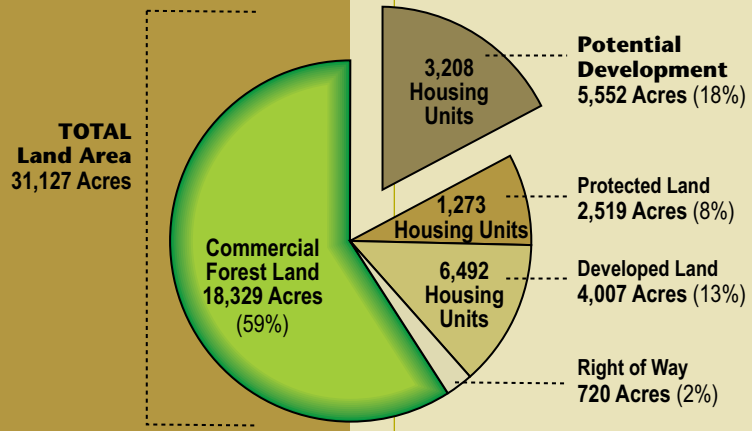
HOW CAN I HELP?

- Respect the natural features of watershed properties.
- Donate or sell your Lake Whatcom Watershed property to a protection program, or place a conservation easement on your land.
- Sell or transfer development rights to other properties outside the watershed.

CITY OF BELLINGHAM

LAND IN THE WATERSHED

How it's used now, what's protected and what could be built



The land inside the entire Lake Whatcom Watershed equals 31,127 acres and includes 4,007 developed acres. Under current zoning, about 5,552 more acres could be developed. This development would add about 3,208 single-family houses.

The efforts and financial contributions of the City of Bellingham, its partners and generous individuals have protected 2,519 acres from development, through land acquisitions, conservation easements and covenants.

It is estimated that these protections are preventing construction of about 1,273 housing units in the watershed.

What else is government doing?

Reducing the pollution entering Lake Whatcom and protecting our drinking water need the combined efforts of government — from the local to the national level — and the people who live in, work in or visit the watershed.

Bellingham City officials have made protecting and enhancing Lake Whatcom their top priority, and expect to consider rigorous actions during 2007 and beyond to ensure this vital resource is preserved.

The City of Bellingham, Whatcom County and the Lake Whatcom Water and Sewer District have a long-standing partnership to protect Lake Whatcom through the Lake Whatcom Management Program.

Key local efforts to date include:

- Conducting ongoing lake and tributary testing.
- Protecting watershed land from development through purchases, conservation easements and lake-friendly management of properties.
- Lake-friendly zoning.
- Permit rules that encourage low impact development.
- Stormwater treatment.
- Upgrading and extending sewer systems.
- Regulation of construction, boating, septic systems and fertilizer use.
- Watershed protection education.
- Programs that help residents install lake-friendly landscaping.

State and federal efforts include:

- Financial and technical support for local programs.
- Lake-friendly management of logging.
- Environmental legislation.
- Enforcement of environmental, health and habitat laws.

HOW CAN I HELP?

We can't depend on government actions alone to protect Lake Whatcom. We will only solve the pollution problems of Lake Whatcom through the actions of the thousands of people who live in, work in, visit or drink water from the watershed.

It might be easier if there were some big villain dumping bucketsful of toxic waste into the lake – but there's no big villain here. The lake is overloaded with contaminants because a little here and a little there adds up to a lot.

Lake-friendly practices are suggested on various pages of this report, as well as on web sites of the City of Bellingham and our partners in the stewardship of Lake Whatcom. Are the lists too long? Just follow four guidelines:

- **Direct as much rain water as possible toward soil.** If we can direct phosphorus into the ground, it will be used by microorganisms and won't end up polluting the lake. Direct rainwater toward soil by directing downspouts toward vegetated areas, or installing rain barrels. Build walkways or driveways with materials that let water seep through. Keep and maintain healthy trees and shrubs on your watershed property — they help soak up water. Consider protecting undeveloped watershed land to ensure it will never be built on.

- **Obey environmental laws.** Phosphorus-containing fertilizers are prohibited in the Lake Whatcom Watershed, with limited exceptions. On construction sites, follow erosion control rules to prevent muddy runoff, and don't leave any dirt exposed when prohibited by wet-season laws. Obey septic tank inspection laws. Follow boating rules. Don't pump contaminated bilge water. Don't use empty land as a dump.

- **Keep contaminants out of the lake.** The stormwater treatment system is spotty, so whatever spills in the watershed — including detergent and motor oil — may wash into the lake. If you use a motorboat, refill oil and gas away from the water and be prepared to mop up spills. Don't wash your car on a street or driveway. Maintain cars and boats, so they don't leak.

- **Tread lightly in the watershed.** Leave your car at home by walking, riding a bike or taking the bus. Paddles, oars and sails are better choices for the lake than boat engines. For motorized boats, choose the cleanest engines possible, and practice preventive maintenance. In the woods, stay on trails to protect vegetation. Clean up after your pet, even in your own yard. Learn how to discourage geese from living on shoreline property. Learn other stewardship solutions from the web site of the Lake Whatcom Management Program, www.lakewhatcom.wsu.edu.

Why does Silver Beach have special development rules?

To protect Lake Whatcom and its tributaries.

The rules limit the size of new construction near Lake Whatcom, and limit the time of year when land can be cleared or left bare.

If you clear a piece of land, it can yield up to 1,000 times as much sediment as it did before being cleared, so limiting major excavation to the drier times of the year is effective in preventing phosphorus-laden soil from reaching Lake Whatcom. Too much phosphorus flowing into Lake Whatcom is causing algae to grow, which lowers the quality of our drinking water.

Most of Bellingham's Silver Beach Neighborhood is in the Lake Whatcom Watershed, which means that when it rains, stormwater flows toward ditches or creeks that empty into Lake Whatcom. When stormwater flows across bare land on a construction site or impervious surfaces like asphalt driveways, the water picks up phosphorus and other pollutants.

The more that vegetated areas remain on each newly developed lot, as well as existing lots, the more stormwater will continue to be captured by trees and absorbed into the ground, instead of adding to the stormwater flowing into Lake Whatcom. Impervious surfaces — most concrete and asphalt, as well as roofs of houses, garages and sheds — prevent water from being absorbed into the ground underneath. So limiting the size of the footprint of new construction is an effective way to limit its impact on Lake Whatcom.

What is the Silver Beach Ordinance?

- A law adopted by Bellingham City Council in January 2001.
- The rules apply to all of the Silver Beach Neighborhood, except for a small portion where stormwater doesn't flow into Lake Whatcom.
- Construction rules limit the amount of exposed dirt from excavation or land clearing to 500 square feet during the wettest time of the year, from Oct. 1 to April 30. Large excavations not completed by Oct. 1 must be covered to prevent muddy runoff.
- The maximum fine for construction violations is $1,500 per day.
- Footprint rules limit how much of a lot can be covered with impervious surfaces, such as pavement or roof, and pervious systems, such as uncovered decks and masonry pavers. The limit for each is typically 15 percent of a lot or 2,000 square feet, whichever is greater. However, lots smaller than the zoned minimum size are restricted to 15 percent.
- Permission to exceed the footprint limits may be granted if native vegetation is retained or planted, or by agreeing to keep another watershed lot undeveloped.

Why are some boat engines restricted on Lake Whatcom?

Benzene is a harmful compound found in gasoline. The U.S. Environmental Protection Agency considers benzene at any level a risk to human health. Other scientific studies have shown petroleum pollution harms aquatic life.

City of Bellingham water monitoring has detected benzene at extremely low levels in its treated drinking water and in untreated Lake Whatcom water.

Studies conducted by the E.P.A. indicate carbureted two-stroke engines discharge 25 to 30 percent of their fuel, unburned, into the water when operated at full throttle. These engines are responsible for a disproportionate loss of fuel discharged into water bodies compared with other engine types.

For motorized watercraft, better choices are four-stroke engines and direct fuel injection two-stroke engines. They use less gasoline and less oil, and they reduce fumes and noise. Better yet, use boats powered by your muscles or the wind.

To protect the health of everyone who depends on Lake Whatcom for drinking water, Bellingham City Council and Whatcom County Council have restricted the use of carbureted two-stroke boat engines.

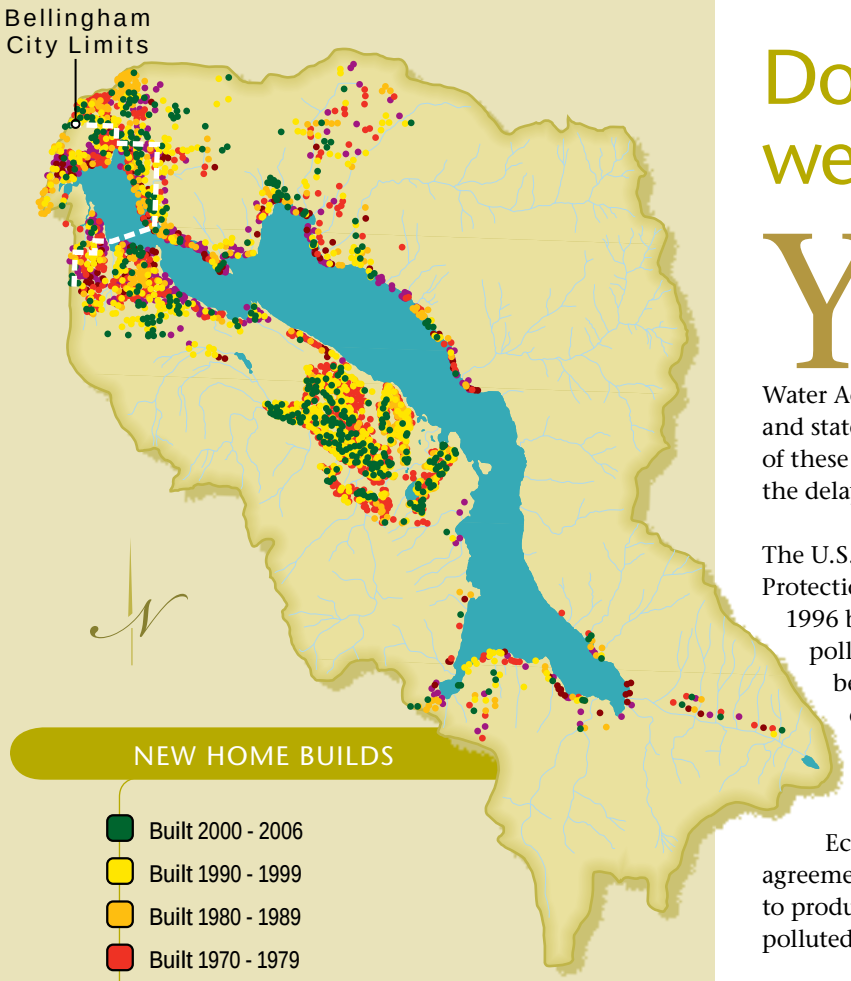
The operation of all carbureted two-stroke engines is prohibited on the portion of Lake Whatcom inside Bellingham City limits (except those meeting 2006 or later Environmental Protection Agency emission standards). On the rest of Lake Whatcom, restrictions will take effect in 2009 and 2013.

— City of Bellingham Ordinance 2005-06-045
— Whatcom County Ordinance 2004-042

Lake Whatcom Facts, 2007:

- The drinking water source for about 95,000 residents of Whatcom County, about half the county's population.
- The City of Bellingham withdraws water from Basin 2 through a 1,200-foot wooden pipeline that leads to Whatcom Falls Park.
- The Lake provides drinking water for the City of Bellingham system, Lake Whatcom Water and Sewer District, several smaller water districts and associations, and a few hundred homes that draw water directly from the lake.
- Holds about 250 billion gallons of water.
- About 10 miles long and just over a mile wide at widest point.
- Lake surface about 5,000 acres, with 8 percent inside Bellingham.
- About 30 miles of shoreline.
- Average elevation 314 feet above sea level.

- About 36 tributaries (many not year-round) flow into the lake, augmented by water diverted from the Middle Fork of the Nooksack River.
- Drains naturally into Bellingham Bay via Whatcom Creek.
- Lake Whatcom Watershed about 56 square miles (36,000 acres), with about 3 percent inside Bellingham.
- About 15,000 people live in the Lake Whatcom Watershed, in about 6,500 homes (as of March 2007).
- The legal maximum lake level was established at 314.94 feet by Whatcom County Superior Court in 1953. The City of Bellingham controls lake level by a control dam at the head of Whatcom Creek.



Do federal and state laws require we clean up Lake Whatcom?

Yes. Cleaning up Lake Whatcom has become more than just a good idea. It is required by the federal Clean Water Act — adopted in 1972 — and state laws. Implementation of these laws has been slow, but the delays are about to end.

The U.S. Environmental Protection Agency was sued in 1996 because Washington's polluted waters were not being cleaned up fast enough. As a result of that lawsuit, the E.P.A. and the Washington State Department of Ecology entered into an agreement that requires Ecology to produce plans to clean up polluted waters on a schedule.

Ecology expects to complete, probably in 2008, a plan that will limit the amount of phosphorus that can be discharged into Lake Whatcom from its tributary creeks and ditches that collect stormwater.

In 1998, Ecology listed Lake Whatcom among the state's water bodies that failed to meet water quality standards. This list is called the 303(d) list, because the process is described in that section of the Clean Water Act. Lake Whatcom was listed because of low levels of dissolved oxygen.

Based on that listing, Ecology began working on a mandatory water quality improvement plan aimed at returning the lake to natural levels of dissolved oxygen. The plan will limit the amount of phosphorus flowing into the lake, because phosphorus is the primary cause of Lake Whatcom's low levels of dissolved oxygen. Ecology will set the phosphorus goals. The City of Bellingham and Whatcom County will then have to operate programs and/or set regulations to meet those goals. In other words, Ecology will require results, and local governments will determine how to achieve those results. The requirements will include timelines for year-by-year actions.

Have your car washed commercially, because the wastewater will be treated. If you must wash it yourself, do it on the lawn or gravel, where wastewater will seep into the ground. And don't use phosphorus-containing detergent.

The overall goal will be that no more phosphorus is discharged into the lake than would be discharged under natural conditions — without human impact. The target level selected by Ecology is the phosphorus discharge from Smith Creek, which flows mostly through commercial forest land on the north shore of Lake Whatcom and is the cleanest of the Lake's tributaries.

Ecology has a new tool to ensure compliance. The goals are now included in permit requirements for stormwater systems in urban areas.

Under Federal rules that went into effect in February 2007, a stricter discharge standard now applies to any stormwater conveyance (including roadside ditches) owned or operated by

Pick up pet waste, even in your own yard.

Bellingham or Whatcom County, whether they are inside Bellingham, in Bellingham's Urban Growth Areas or in any urbanized area in the watershed (including Sudden Valley). These components of the public stormwater system flowing into Lake Whatcom are now designated as "point sources" of pollution (the longtime designation for specific sources of pollution, for example factories). These stormwater conveyances must for the first time obtain discharge permits from Ecology that will limit phosphorus discharges.

For "non-point sources," the standard of compliance remains less strict: a reasonable assurance the pollution reductions will be made. Non-point sources include stormwater that enters the lake or a tributary without ever entering a stormwater system owned or maintained by a city or a county. This stormwater can originate from any location, including a private driveway, a store parking lot, or a stormwater ditch owned by Sudden Valley Community Association (because it is private).

Achieving the targets Ecology will set to reduce the amount of phosphorus entering Lake Whatcom will require action not only by governments but by the people who live in, work in or visit the Lake Whatcom Watershed.

ANNA THORDARSON

PHOSPHORUS IS THE CULPRIT

Based on studies conducted by various scientists, Washington State Department of Ecology has already determined:

- The dissolved oxygen problem is caused by increases in phosphorus entering Lake Whatcom with stormwater.
- There are few choices for removing phosphorus once it is in the water.
- The greatest increases in phosphorus-loading to the lake come from the most developed areas.
- Some of the increase is because in developed areas precipitation carrying contaminants enters streams that flow directly to the lake without getting filtered through phosphorus-removing soil.
- Some of the increase is because stormwater reaches creeks faster in developed areas, causing erosion.
- It's necessary to lower the amount of phosphorus entering Lake Whatcom, so the sooner we start doing so, the better.

Joan Vandersypen, a scientist with the Institute for Watershed Studies at Western Washington University, programs an automatic sampling pump to collect a sample every 90 minutes from a stormwater treatment system, in August 2001.

What is a TMDL?

The letters stand for Total Maximum Daily Load. A TMDL is a mandatory water quality improvement plan. The "load" in TMDL refers to the amount of a pollutant a water body can receive without violating state water quality standards. A TMDL is a plan, an amount of pollution, a document and a process that involves public comment.

All TMDLs have five main parts:

- An identification of the type, amount, and sources of water pollution in a particular water body or segment.
- A determination of how much the pollution needs to be reduced or eliminated to achieve clean water.
- An allocation showing how much pollution each source will be allowed to discharge.
- A strategy to meet these allocations.
- A monitoring plan to make sure the water is getting cleaner as the TMDL is implemented.

What is the Lake Whatcom TMDL?

During the summer of 2007, the Department of Ecology is expected to release a Total Maximum Daily Load study for Lake Whatcom. This study will include a scientific model that will determine where pollution needs to be reduced, and by how much, in order for the lake to have sufficient dissolved oxygen.

After public comment, based on this study Ecology will develop a TMDL report, which will identify where pollution needs to be reduced and by how much. After E.P.A. approval and more public participation, an implementation plan will be readied.

The Lake Whatcom TMDL will determine the amount of phosphorus that can be loaded, or discharged, into the lake without lowering the oxygen levels below natural levels.

Natural levels are estimated by modeling oxygen levels in the lake when natural levels of phosphorus are present — that is, the levels of phosphorus prior to human activity.

Once that maximum load is determined, Ecology will allocate portions of the load to 23 geographic areas of the watershed, so the sum of the loads doesn't exceed the maximum allowed.

Within each geographic area, known as a sub-watershed, allocations of the allowed amount of phosphorus will be further divided into how much phosphorus can be discharged from the Bellingham stormwater system, from the Whatcom County stormwater system, from commercial forestry, and from non-point sources such as the homes and other development surrounding particular creeks. The required reductions in phosphorus won't be measured directly, because it's too variable, but by a yet-to-be-determined surrogate.

Don't use fertilizer that contains phosphorus.

Direct rainwater into the ground, where phosphorus can be absorbed and used by plants, instead of letting it flow directly into stormwater ditches, creeks or Lake Whatcom.

The TMDL will set the goals for how much needs to be done, and where. The City and Whatcom County will be required to set regulations and/or operate programs to meet those goals.

Future development levels will affect what will be required in already developed areas

The scientific model that will be the basis of the TMDL allocations will calculate the amount of phosphorus loading in three ways:

- Under natural conditions.
- Under conditions in 2002, when water samples were collected.
- Projected as if the entire watershed is built out in the same way developed areas have been built until now.

Read more about lake-friendly practices at:
www.lakewhatcom.wsu.edu

Much more phosphorus is discharged from developed areas than from natural areas. So if the more than 3,000 additional homes allowed under current zoning are built, they will add significantly to the amount of phosphorus that is loaded into the lake.

To the extent the City and the County prevent future residential development — by property acquisitions, zoning changes, incentives or other regulations — less effort will be needed to reduce phosphorus loading and preserve the health of the lake.

We're not starting from scratch

The City of Bellingham has already put into effect many programs and regulations that will satisfy goals Ecology is expected to include in the Lake Whatcom TMDL, although some of these programs and regulations might need to be expanded or improved. Examples are:

- Protecting watershed land from development.
- Teaching residents lake-friendly gardening techniques.
- Banning fertilizers containing phosphorus.
- Educating pet owners to pick up animal waste.

Carpool, bus, bike or walk to reduce pollution from motor vehicles.

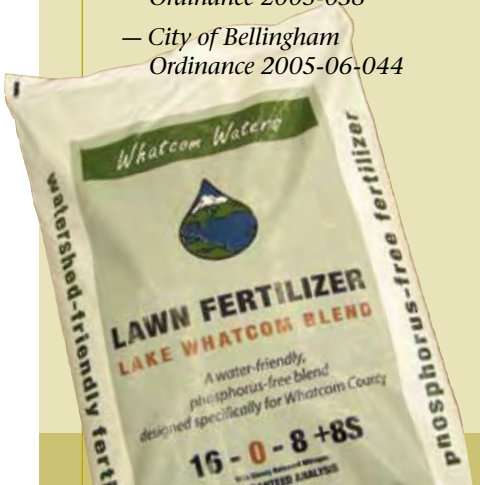
- Offering incentives to decrease motor vehicle use.
- Refitting stormwater treatment systems with new technology that targets phosphorus.
- Street sweeping.

CITY OF BELLINGHAM

IT'S THE LAW

— *Whatcom County Ordinance 2005-038*

— *City of Bellingham Ordinance 2005-06-044*



No person shall apply any commercial fertilizer to residential lawns or public properties within the Lake Whatcom Watershed, either liquid or granular, that is labeled as containing more than 0% phosphorus or other compounds containing phosphorus, such as phosphate, except when applied to newly established turf or lawn areas in the first growing season.

No commercial fertilizer of any type shall be applied when the ground is frozen.

No person shall apply, spill or otherwise deposit commercial fertilizer on impervious surfaces. Any fertilizer applied, spilled or deposited, either intentionally or accidentally, on impervious surfaces shall be immediately and completely removed.

CITY STORMWATER TREATMENT

- Stormwater facilities
- Treatment areas completed 1992-2006
- Treatment areas planned by City 2007-2008
- Areas where stormwater is not treated by City
- Untreated area drains to Whatcom Creek
  (therefore lower priority for stormwater treatment)

By the end of 2008, the City of Bellingham will be treating stormwater collected from *321 acres* in the Lake Whatcom Watershed. This includes *56 percent* of the City's portion of watershed land draining toward Lake Whatcom. *(The 321 acres include 56 acres outside City Limits that are in Bellingham treatment areas. These 56 acres are not included in the percent calculation.)*

Why is the City of Bellingham treating stormwater?

We depend on stormwater drainage systems. This network of ditches, pipes, culverts and creeks keeps water from flooding our roads, yards and the buildings where we live, work, go to school or relax.

We need this stormwater system because we have added impervious surfaces to the earth — that is, surfaces that don't let water seep through. In the natural environment, rainwater is captured by soil and plants and slowly released into creeks, lakes and bays, or into the atmosphere. The more we replace nature's stormwater system with buildings and paved surfaces, the more runoff is channeled into the stormwater drainage system.

Stormwater runoff has two unintended consequences:

- It carries pollutants, including phosphorus, from lawns, exposed soil, roads, parking lots, and other developed land into our creeks, lakes and bays.
- During the wet season, the volume, peak flow and duration of the runoff increase dramatically. The high volumes undercut and erode stream banks, widen stream channels, deposit excessive sediment and alter natural stream and wetland processes. This changes or damages fish and wildlife habitat, and overloads bodies of water like Lake Whatcom with nutrients, including phosphorus.

The City of Bellingham completed construction of its first stormwater treatment system in 1992. Since then, the City has spent about $1.4 million building stormwater treatment systems in its highest-priority area: the Lake Whatcom Watershed. Spending will reach about $2 million when watershed projects planned for 2007 and 2008 are completed.

Bellingham's first stormwater treatment systems were designed to capture bacteria and solids (including mercury and other metals), to prevent them from flowing into Lake Whatcom. They are effective at capturing bacteria and solids — important goals for the quality of our drinking water, the health of fish and the overall cleanliness of Lake Whatcom.

But the threat to Lake Whatcom from phosphorus would not be understood for several years. And the technology to remove phosphorus from stormwater is still in its infancy. Bellingham is one of many communities searching for effective methods to remove phosphorus from stormwater.

Since 2001, Bellingham has been refitting stormwater systems and building new ones in order to attempt to remove phosphorus. So far, despite the use of state-of-the-art technology, results have been disappointing. Measurements have not shown City stormwater systems to be effective at lowering the concentration of phosphorus downstream of filtration.

However, recent retrofits have shown promising early results. In addition, bioswales and other treatment methods that infiltrate part of the stormwater into the ground are presumably taking advantage of the soil's natural ability to absorb phosphorus.

Nevertheless, the City continues seeking stormwater treatment systems that can be proven to remove phosphorus. One forward-looking method the City uses is to install cartridges containing filtering materials. Like water filters in your home, these filters are replaced at set time intervals. The filtering materials used in these systems are currently being improved by manufacturers to better target phosphorus removal. Scientists working for the City are also experimenting with phosphorus-absorbing materials for use in other stormwater treatment systems.

The City follows "best management practices" required by the Washington State Department of Ecology, which are updated whenever better stormwater treatment methods are developed. Bellingham is ahead of most communities of our size in the state, having adopted the Ecology stormwater manual and substantially meeting all recommendations of the Puget Sound Action Team's management plan.

Meanwhile, federal and state regulations leave us no choice: We must limit the amount of phosphorus reaching Lake Whatcom. But since we cannot depend on current methods of removing phosphorus, we must focus on preventing phosphorus from reaching the stormwater ditches and creeks that flow into Lake Whatcom.

This means the bulk of the responsibility for phosphorus reduction must fall on residents of the watershed and people who work in or visit the watershed. Government and environmental organizations can provide education and support, but individual actions will determine how much phosphorus continues to flow into Lake Whatcom.

HOW CAN I HELP?

- Have your car washed commercially, where sudsy water is not released untreated.
- If you must wash your own car at home, wash it on a porous surface like a lawn.
- Scoop the poop! Don't leave pet waste to decompose.
- In your yard, allow as much water as possible to soak into the ground instead of running off in polluted torrents.
- Channel rainwater into a rain garden, where it can soak into the ground.
- Collect rainwater in rain barrels and use it for outdoor watering activities.
- Use porous cement or pavers, which let water soak through and into the ground.
- Rake leaves and needles off sidewalks and driveways, to keep them out of the stormwater system.

CITY OF BELLINGHAM

CAN STORMWATER BE TREATED AT HOME?

Yes. We can direct stormwater into our yards, to harness the soil's natural ability to absorb phosphorus and other pollutants.

The best way to reduce the amount of phosphorus reaching Lake Whatcom is to reduce the volume of stormwater runoff, and every little bit counts.

In 2007, the City of Bellingham plans to build at least five residential stormwater retrofit projects, for homeowner volunteers in the Lake Whatcom watershed. These will be demonstration projects to illustrate small-scale stormwater treatment methods that may include:

- Collecting water from gutters to use on lawns or gardens.
- Constructing porous walkways and driveways that reduce runoff by allowing water to seep to the ground underneath.
- Installing rain gardens that filter pollutants.
- Increasing other vegetated landscape features.
- Amending soils to increase phosphorus absorption and retention.


DAVID SCHERRER

A Washington Conservation Corps crew weeds and removes litter from the rain garden near the Bloedel Donovan Park boat launch, in March 2007. The curb cut allows stormwater runoff from the parking lot to enter the rain garden, where plants and soil capture pollutants.

An award-winning project

The Bloedel Donovan stormwater project won the American Public Works Association's Charles Walter Nichols Award for Environmental Excellence in 2005. The project cost about $123,000. It was funded by the City of Bellingham Storm and Surface Water Utility, with a small grant from Puget Sound Action Team, which is responsible for implementing Washington State's environmental agenda for Puget Sound. The engineering staff of Public Works designed the water quality system. Several city departments and Washington Conservation Corps assisted with construction.

How is stormwater being treated at Bloedel Donovan Park?

Again and again and again.

Redundancy was the key word guiding the City's Public Works Department in designing a stormwater project for Bloedel Donovan Park. Since no single stormwater treatment method has been shown to be effective at removing phosphorus, water flowing off the Bloedel Donovan parking lot is guided through a series of systems, so the cumulative treatment prevents as much phosphorus and other contaminants as possible from reaching Lake Whatcom.

This project, constructed in 2003, won the American Public Works Association's Charles Walter Nichols Award for Environmental Excellence in 2005. The award application was aptly titled, "Getting Less from a Lot."

Before the project was built, stormwater running off the parking lot at Bloedel Donovan Park flowed directly into Lake Whatcom, carrying with it automotive fluids, animal waste and contaminated water from boats. This three-acre parking lot is the largest in the Lake Whatcom Watershed. It serves hundreds of vehicles a day, including many that haul trailers to the lake's most accessible boat launch. Unfortunately, some boaters deposit motor fluids and other contaminants in the parking lot when they ignore the prohibition on dumping bilge water.

Now, 99 percent of water running off the parking-lot asphalt is treated to remove contaminants before they reach Lake Whatcom.

Four types of systems were built:

Rain Gardens:
Two clusters of bushes and groundcover are doing double duty — adding beauty to the park and harnessing the natural processes of plants and soil to capture pollutants. Two rain gardens were installed, one near the park's Electric Avenue entrance and the other near the boat launch. Much of the stormwater runoff from the parking lot flows downhill into one or the other rain garden. As water seeps slowly through specially constructed mulch, soil and gravel layers, pollutants are filtered out.

Plants in the rain gardens include yellow monkeyflower, black twinberry, Nootka rose, kinnikinnick, evergreen huckleberry and common snowberry. These Pacific Northwest native plants were selected because they can thrive in very wet soil and very dry soil. They are adapted to our weather and resistant to local pests, minimizing the need for fertilizers or pesticides. These plants get some of their nourishment by absorbing nutrients carried by stormwater runoff.

The rain garden near the boat launch catches parking lot runoff that can't be guided toward any other treatment system.

Filter Cartridges
Two underground vaults filled with 18-inch-diameter filter cartridges were also installed in the park. Any stormwater that exceeds the upper rain garden's capacity overflows into the filter cartridge system. In the lower parking lot, a berm was built to divert stormwater away from the lake and into the cartridge vault.

The cartridges are packed with material designed to absorb contaminants. Like filters in your car, these cartridges are replaced at regular intervals. That lets the City try new materials, as the science of stormwater treatment advances. The original perlite cartridges have been replaced with a mixture of perlite, zeolite and granulated carbon.

So far, measurements indicate the cartridges are not effective at removing phosphorus, despite manufacturer claims they would be. The City will continue to install the best filtering materials as they become available.

Sand Filter
A sand-filter structure was designed to capture stormwater runoff from Electric Avenue, the arterial street bordering the park. Pipes transport stormwater runoff from the roadway toward the filter, where sand particles trap some pollutants.

Infiltration Galleries
Two infiltration galleries take water cleaned by the other three systems and direct it into the ground. Infiltration galleries are rows of buried pipes with holes that release water into the soil, where phosphorus can nourish plants. One gallery was installed near the playground and swimming area, the other near the boat launch and picnic area. After construction, topsoil was replaced and replanted as lawn, so the infiltration galleries operate without disrupting the functionality and beauty of the park.

HOW CAN I HELP?

- Walk or ride your bike to Bloedel Donovan Park.
- Or catch a WTA bus. Bloedel Donovan is only a 15-minute ride from Bellingham's downtown station, with buses leaving 25 minutes after the hour. For details, call 676-RIDE(7433).
- Boaters are prohibited from dumping bilge water at Bloedel Donovan Park.
- Bring your dog to the park to help chase away geese. The park is an off-leash area daylight hours from Oct. 1 to April 30, and from dawn to 10 a.m. from May 1 through Sept. 30.
- Always pick up after your dog.

TORE OFTENESS

FILTER CARTRIDGE CUTAWAY

CONTECH STORMWATER SOLUTIONS INC.

Stormwater enters an underground vault, where it flows through cartridges that are packed with filtering material designed to remove pollutants. Cartridge replacement occurs approximately annually, or when the material becomes plugged. Replacement may easily include new and improved filtering materials for better removal of pollutants, such as phosphorus, as such materials become available.

Can I eat the fish from Lake Whatcom?

Yes or no, depending on the type of fish, your age and whether you are a man or a woman.

Mercury has been found in Lake Whatcom smallmouth bass and yellow perch, and in largemouth bass in other Whatcom County lakes. Mercury can affect the development of the nervous system, which can result in learning disabilities in children. In adults, mercury can also affect the heart and the immune and reproductive systems.

Children are most at risk for the effects of mercury. Pregnant women, those who are breastfeeding or who are planning a future pregnancy may pass mercury contamination on to their children.

Lake Whatcom Fish Advisories

From Whatcom County Health Department and Washington State Department of Health

	Smallmouth Bass	Largemouth Bass	Yellow Perch
Women of childbearing age	Do not eat.	Don't eat more than two meals* per month.	Don't eat more than one meal* per week.
Children younger than age 6	Do not eat.	Don't eat more than two meals* per month.	Don't eat more than one meal* per week.
Other people	No restriction.	No restriction.	No restriction.

* *Meal size ranges: One ounce for a 25-pound child, three ounces for a 70-pound child, six ounces for women weighing less than 135 pounds, eight ounces for larger adults.*

There is no detectable concentration of mercury in Bellingham's drinking water, or in Lake Whatcom.

Mercury is found in the tissue of large fish because mercury concentrations increase at every step up the food chain. Mercury present in a lake or creek is taken up by bacteria, which are eaten by their predators, which are eaten by their predators, all the way up the food chain to large fish. Concentrations of mercury in large, older fish can be many times concentrations found in insects near the bottom of the food chain.

Is swimming in Lake Whatcom safe?

Yes. It is safe to swim in Lake Whatcom.

Blue-green algae: Local health officials have not seen enough of the toxin-producing type of algae in Lake Whatcom to harm swimmers or pets. Although some of the algae growing in Lake Whatcom can produce toxins, concentrations have been too low to be of any concern. If blue-green algae are present in a high enough concentration to create a problem, there is typically the tell-tale appearance of a bluish or greenish paint-like material on a lake's surface. If this is ever observed, give the City's laboratory a call, at 676-7689, so scientists can determine if there's a danger to swimmers or pets.

Bacteria: The City of Bellingham monitors the water at Bloedel Donovan Park weekly in warm weather. High concentrations of bacteria have not been found since 2003, when beach closures were necessary. In 2002 and 2003, the City closed the Bloedel beach several times because of high concentrations of E. coli bacteria, but not the dangerous type of E. coli that is often associated with undercooked meat. DNA testing implicated Canada geese as a significant contributor to the fecal pollution at the swim area. If any beach must be closed for health reasons, signs are posted and announcements are made online and in local media.

Swimmer's itch: Lake Whatcom typically does not have a problem with swimmer's itch, the common name for a rash caused by a parasite that thrives in shallower lakes.

Protozoa: The Bellingham drinking water lab monitors the intake for giardia and cryptosporidium. These parasites enter lakes and rivers through sewage and animal waste, and cause gastrointestinal illness. Although levels in 2006 were not detectable, and the risk of exposure is considered to be very low in Lake Whatcom, exposure is still possible by drinking untreated lake water.

RESOURCES

The City of Bellingham is online at ***www.cob.org***. The Public Works Department, which can be reached at 676-6850, is in charge of the City's drinking water, sewer and stormwater systems, and coordinates environmental programs. The Lake Whatcom Watershed Advisory Board, a citizens group appointed by the mayor that advises the City regarding the watershed land acquisition program, meets 7 p.m. the third Thursday of every month, in City Hall. Find out more online or at 676-6961.

The Lake Whatcom Management Program is the joint effort of the City of Bellingham, Whatcom County, and Lake Whatcom Water and Sewer District (formerly Water District 10) to protect Lake Whatcom as the source of drinking water for about half the residents of Whatcom County. Its web site ***www.lakewhatcom.wsu.edu*** is the most complete source for local **stewardship solutions**. Find tips about septic systems, lake-friendly gardening, cars, boating, Canada geese, construction, hobby farms and pet waste. The program's pamphlet "**Boatnotes: A handbook for boaters on Lake Whatcom**" summarizes environmental regulations for boaters and suggests dozens of lake-friendly practices. For a copy, call Bellingham's Environmental Resources office, 676-6961.

Whatcom County is online at ***www.co.whatcom.wa.us***. The Public Works Stormwater Division coordinates tasks identified through the Lake Whatcom Management Program, and can be reached at 715-7450. Environmental health issues are handled by the Health Department, which can be reached at 676-6724.

Lake Whatcom Water and Sewer District (formerly Water District 10) is online at ***www.lwwsd.org***, or call 734-9224.

Institute for Watershed Studies at Western Washington University monitors Lake Whatcom under a contract with the City of Bellingham. Reports are online at ***www.ac.wwu.edu/~iws***.

Washington State Department of Ecology is online at ***www.ecy.wa.gov***. For background information on water quality improvement plans and specific information about Lake Whatcom, search "TMDL." The Ecology web site will announce opportunities for public comment on the draft plan for Lake Whatcom, or call Ecology's Bellingham field office, 738-6250.

Washington State Department of Natural Resources implements the Lake Whatcom Landscape Management Pilot Project on about 15,000 acres of state forest trust land in the Lake Whatcom Watershed. Read about the program on the DNR web site ***www.dnr.wa.gov*** (search "Lake Whatcom.")

Washington State Department of Health Office of Drinking Water is online at ***www.doh.wa.gov/ehp/dw***, or call (800) 521-0323.

Washington State Department of Fish and Wildlife is online at ***www.wdfw.wa.gov***, or call the Bellingham office for freshwater resources, 676-2146.

Many local non-profit organizations contribute to the health of Lake Whatcom, including:

— **Whatcom Land Trust**, which protects land from development, and is online at ***whatcomlandtrust.org***, or call 650-9470.

— **RE Sources**, which helps residents actively safeguard our environment, and is online at ***www.re-sources.org***, or call 733-8307.

— **Sustainable Connections**, which promotes the Whatcom Watershed Business Pledge, and is online at ***www.sconnect.org***, or call 647-7093.

— **Nooksack Salmon Enhancement Association (NSEA)**, which is working with the Dept. of Fish and Wildlife and Whatcom County to develop a Lake Whatcom Native Kokanee and Cutthroat Trout Conservation and Recovery Plan, and is online at www.n-sea.org, or call 715-0283.

CREDITS

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Maps based on data provided by City of Bellingham.

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Printing: Premier Graphics on New Leaf Reincarnation Matte, manufactured with Greene-e® certified renewable energy, 100% recycled fiber, 50% post-consumer waste, and processed chlorine free, the use of which saved an estimated 7 fully grown trees, 1,468 gallons of water, 3 million Btu energy, 321 pounds solid waste, and 543 pounds greenhouse gases.

Calculations based on research by Environmental Defense and other members of the Paper Task Force.

City of Bellingham 2009

Water Quality REPORT

This report is a requirement of the Safe Drinking Water Act. It provides you with a summary of the monitoring results from your drinking water. Once again, Bellingham's drinking water met all standards for purity in 2009.

The #1 Water Saving Device is You...

Last summer you proved it! During the hottest week of 2009, the City of Bellingham treatment plant could not supply enough water to meet typical summer use. Staff observed that the water-purification filters clogged at an unusually fast rate. While the water produced was of high quality, the supply could not keep up with community demand. The clogged filters could only produce 19.5 million gallons of water per day instead of the typical 21-22 million gallons per summer day. City staff worked with scientists from Western Washington University and Seattle Public Utilities to discover an overgrowth of microscopic algae in Lake Whatcom, the source water, clogging the treatment-plant filters.

Limitations in water production combined with high demand resulted in a reduction in the City's ability to provide adequate fire protection to our community. On the afternoon of July 30, 2009, the City of Bellingham initiated mandatory outdoor watering restrictions. Bellingham water customers reduced demand by almost 7 million gallons in two days. Residents limited outdoor watering and implemented other water conservation measures, filling all water reservoirs and enabling the City to lift the mandatory restriction in five days.

Bellingham residents proved YOU are the best water saving device! Thank you for your water conservation efforts!

Published May 2010

If you have any questions, contact Lab Supervisor Peg Wendling at 778-7872.

A letter from **Mayor Dan Pike**

Last summer provided a critical test of our ability to provide clean, safe drinking water to our customers. As described in this publication, an extensive algae bloom clogged water treatment filters, requiring us to enact mandatory water restrictions to ensure that our treatment plant could produce enough water for our community's priority uses.

We proved that by working together, we can cut our water use in a time of urgent need. We are prepared for similar conditions this year and beyond, but the bottom line is this: we must keep water demand low and reduce nutrients in the lake that feed algae.

We are working hard to promote water conservation throughout the City and County. This publication and the City website provide tips for how you can reduce your water use. Reducing water use should no longer be thought of as voluntary, but rather a lifestyle change that is necessary throughout our community and our region.

Last summer's problems also underscore the importance of improving water quality in the Lake Whatcom Reservoir. The quality of our drinking water after treatment meets all state and federal regulations. Yet last summer's experience is just one of many consequences of a deteriorating source water. Local governments continue to study the lake, take action to protect and improve it, and make wise decisions about its future. Key steps include protecting undeveloped land in the watershed, improving stormwater treatment, and helping watershed residents become better stewards of the lake.

I hope you will join us in our efforts to protect this essential resource.

Dan Pike
Mayor Dan Pike

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- **Pay bills**
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- **Examine usage history**

Please visit our website:
https://www.cob.org/utilitybillpay/

Detected Substances	2009 Level Detected *(or most recent)*	EPA Maximum Contaminant Level *(MCL)* or Action Level (AL)	In Compliance?
Disinfection By-products: Total Trihalomethanes (THM) and Haloacetic Acids (HAA). THMs and HAAs are the most common type of disinfection by-products (DBPs). The City samples for DBPs four times a year at four sites in our system.	**THM:** Average: 31.7 ppb, Range: 18.4 to 46.0 ppb **HAA:** Average: 13.8 ppb, Range: 4.0 to 18.2 ppb	For the all site running annual average MCL must be: **THM:** Below 80 ppb and **HAA:** Below 60 ppb	**YES**
Free Chlorine Residual: Chlorine levels are monitored continuously at the water treatment plant and daily at different points throughout the water distribution system.	Of the 1,045 free available chlorine samples collected in the distribution system, the average chlorine was 0.30 ppm with a range of <0.01 - 0.74 ppm	There is a requirement for a 0.2 ppm minimum chlorine residual to the first customer in the distribution system. There is also an average maximum residual disinfection level (MRDL) of 4.0 ppm in the distribution system.	**YES**
Lead and Copper: Lead and copper are monitored every three years in our customer's homes to assess the amount of corrosion occurring in home plumbing. Homes selected are those with leaded solder and copper pipe. The most recent sampling was in 2008.	**Lead:** The 90th percentile value of the 45 homes sampled showed lead at the 14 ppb level. 4% of the homes sampled were above the action level with a range of <2 to 27 ppb lead. **Copper:** The 90th percentile value of the 45 homes sampled was 104 ppb. No sites were above the action level.	The allowable highest 90th percentile values are: **Lead:** 15 ppb **Copper:** 1,300 ppb	**YES**
Total and Fecal Coliform Bacteria: The City samples a minimum of 80 sites in the water distribution system each month for indicator bacteria.	Of the 1,045 samples collected for total and fecal coliform in 2009, three tested positive for total coliform bacteria, and none tested positive for fecal coliform bacteria. All follow-up sampling showed no bacteria at all three sites. This represents coliform in 1% of the samples for June, August and September in 2009.	Allowable highest percentage of total coliform positive samples a month is 5%. The presence of any fecal coliform in drinking water samples for two consecutive samples would require public notification of this problem within 24 hours.	**YES**
Turbidity: Turbidity is a measurement of the clarity of the water. The City monitors turbidity continuously at the beginning, middle and end of the treatment process. Turbidity reported for compliance is in the treated water.	Bellingham's single highest turbidity level for 2009 was 0.21 nephelometric turbidity units (NTU) on 07/28/09 during a power outage. The power was restored within the hour. The City was below the 0.3 NTU requirement in 2009 100% of the time.	Compliance means filtered water turbidity shall be less than or equal to 0.3 NTU in at least 95% of the measurements made each month and shall never exceed 1.0 NTU.	**YES**
Stage II Disinfection By-products: In response to changes in regulations, the City was required to sample 12 worst-case scenario sites at the peak season, to prepare for this stricter regulation.	**THM:** Average: 41 ppb, Range: 37 to 57 ppb **HAA:** Average: 12.5 ppb, Range: 4.6 to 15 ppb	When the new Rule becomes effective in 2012, the site-specific annual average will be: **THM:** Below 80 ppb and **HAA:** Below 60 ppb	**YES**

ppm = parts per million, **ppb** = parts per billion, **MCL** = Maximum Containment Level, **AL** = Action Level

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune-system disorders, some elderly, and infants, can be particularly at risk from infections. These people should seek advice about drinking water from their health-care providers. The EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Department of Health and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) and the Washington State Department of Agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

Elevated levels of lead in drinking water can cause serious health problems, especially for pregnant women and young children. In Bellingham, fortunately, lead is not found in the treated water, but lead in drinking water can come from pipes and faucets in our customers' homes. The City of Bellingham is responsible for providing high quality drinking water, but cannot control the variety of materials used in customers' plumbing. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for at least 30 seconds before using the water for drinking or cooking. You can capture this water to use on plants. If you are concerned about lead in your water, you may opt to have your water analyzed by a local laboratory. To learn more about lead in water, go to: http://www.epa.gov/safewater/lead.

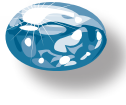
Definitions

Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants (e.g., chlorine, chloramines, chlorine dioxide).

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Health Agency.



Every Drop Counts!

Use rain barrels

If you water outdoors, why not collect **Free** water from the sky with a **Rain Barrel?** Watering your lawn and plants, or washing your car and dog, do not require treated drinking water. A simple rain barrel can provide water for these outdoor uses and help keep your drinking water bill low! To purchase a $25 rain barrel or for more information, contact Public Works at 778-7700 or waterconservation@cob.org.

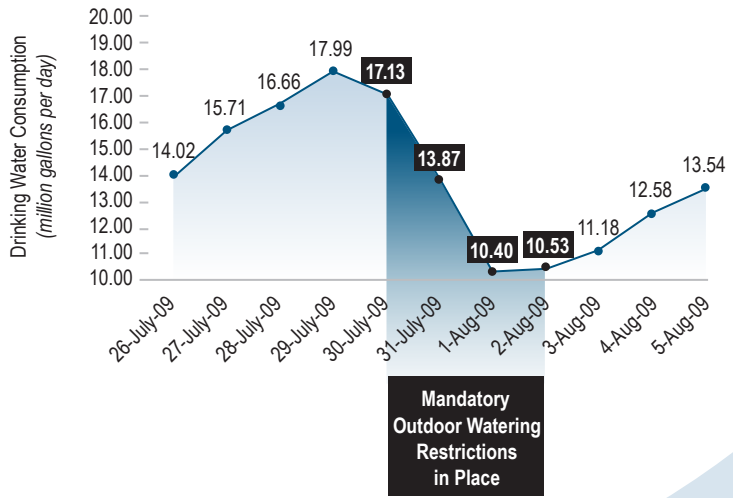
Limit outdoor watering

If you water your lawn, we ask that you adhere to our **Voluntary Watering Schedule** to help conserve water.

- **Odd** numbered street addresses water only on **Sundays, Wednesdays, and Fridays.**
- **Even** numbered street addresses water only on **Tuesdays, Thursdays, and Saturdays.**
- **Mondays no outdoor watering** in order to allow the water supply to recharge.

Lawns in the Northwest typically need only one inch of water per week, and most lawns naturally go dormant during the summer months. Go gold! With a brown lawn, you can save money, water, and have time to enjoy the summer weather doing other things!

Citywide Daily Water Consumption
July/August 2009



Voluntary Watering Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Odd	No Watering	Even	Odd	Even	Odd	Even

More water conservation information can be found at: http://www.cob.org/services/environment/conservation/index.aspx

Watershed Land Acquisition Progress

Our commitment to provide clean, safe drinking water for Bellingham and surrounding water associations and districts begins with careful land management. Watershed protection is the first step in our multi-barrier approach to ensuring pure drinking water. The multi-barrier approach takes potential water quality threats into account and makes sure there are "barriers" in place to either eliminate them or minimize their impact. It includes selecting and protecting the best available source water, using effective water treatment, and preventing water quality deterioration in the distribution system.

In 2001 the City of Bellingham began a program to purchase available land in the Lake Whatcom Watershed to help protect our drinking water source. This program is financed from the Lake Whatcom Watershed Land Acquisition fee on your water bill. **To date, the City has purchased 1,334 acres of land at a cost of $20.8 million. In addition, 164 acres of land have been preserved through conservation easements. A total of 1,498 acres of land is now protected by the Lake Whatcom Watershed Land Acquisition Program.**

A key to ensuring clean, safe and reliable drinking water is to understand the drinking water supply from the source all the way to your tap. To learn more about the land acquisition program and ways you can help us in our source protection efforts, go to **http://www.cob.org/documents/pw/lw/lake-whatcom-land-acquisition-brochure.pdf**

Consider donating, selling or placing a conservation easement on your watershed property.

City of Bellingham
210 Lottie Street
Bellingham, WA 98225

*******ECRWSS****
POSTAL CUSTOMER

Lake Whatcom Water & Sewer District

Annual Drinking Water Quality Report
Agate Heights Service Area
WA State ID# 52957B

2009 CONSUMER CONFIDENCE REPORT

1010 Lakeview St.
Bellingham, WA
98229-2520
(360) 734-9224
www.lwwsd.org

Normal Business Hours:
8:00am to 5:00pm
Monday through Thursday
except Holidays

Emergencies:
360-734-9224 anytime

What is this report?

In accordance with the Federal Government's Re-authorization of the Safe Drinking Water Act of 1996, all public water utilities and companies are required to prepare and provide annual drinking water quality reports to their customers. As well as being required by Federal Law, we want to keep you informed about the excellent water and sewer services delivered to you over the past year. Our goal is to provide safe, dependable, and high quality drinking water.

Where does the drinking water come from?

The Agate Heights water system is served by the Giesbrecht 10-inch artesian well, which is located within the Squalicum aquifer system. This well produces a high quality drinking water supply that contains naturally occurring iron and manganese and other minerals. The water is drawn from the well and undergoes a chlorination and filtration process to reduce the level of iron and manganese, and to provide chlorine residual to protect the water distribution system. Lake Whatcom Water and Sewer District is pleased to report that your drinking water is safe and meets or exceeds all Federal and State requirements.

What's in the drinking water?

Lake Whatcom Water and Sewer District routinely monitors the drinking water in accordance with Federal and State laws. Included are the results for five constituents that are regulated by the U.S. Environmental Protection Agency (USEPA) that were detected during the period of January 1st to December 31st, 2009. To obtain a complete listing of all constituents, please contact the District. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents and/or contaminants. It's important to remember that the presence of these constituents does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at: (800) 426-4791. Abbreviations and terms used in this report include:

Parts per billion (ppb)

Parts per million (ppm)

Nephelometric Turbidity Unit (NTU) – Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

continued on next page

Action Level – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Maximum Contaminant Level (MCL) – The "Maximum Allowed" (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs (see below) as feasible using the best available treatment technology. MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Maximum Residual Disinfection Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Contaminant Level Goal (MCLG) – The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Information for persons with compromised immune systems

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. United States Environmental Protection Agency and Centers for Disease Control (USEPA/CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the toll free Safe Drinking Water Hotline at: (800) 426-4791.

Facts About Detected Contaminants

1) Arsenic

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

2) Copper

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

3) Lead

Elevated levels of lead in drinking water can cause serious health problems, especially for pregnant women and young children. In our Agate Heights system, lead is not found in the treated water, but lead in drinking water can come from pipes and faucets in our homes. Lake Whatcom Water and Sewer District is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for at least 30 seconds before using the water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at: (800) 426-4791, or online at: www.epa.gov/safewater/lead

Testing is completed by Lake Whatcom Water and Sewer District and State certified laboratories.

Detected Contaminant	Violation Yes/No	2009 (or most recent) Level	MCL, AL or MRDL	MCLG	Likely Source of Contamination
Arsenic (1)	No	4 ppb	10 ppb	0 ppb	Erosion of natural deposits, runoff from orchards, runoff from glass, and electronics production wastes
Copper (2)	No	The 90th percentile value of 6 homes sampled showed copper at a level of 178 ppb	1,300 ppb	1,300 ppb	Corrosion of household plumbing, erosion of natural deposits, leaching from wood preservatives
Lead (3)	No	The 90th percentile value of 6 homes sampled showed lead at 2 ppb	15 ppb	0 ppb	Corrosion of household plumbing, erosion of natural deposits
HAAs (4) Haloacetic Acid	No	4.4 ppb	60 ppb	0 ppb	By-product of drinking water chlorination
TTHM (4) Total Trihalomethanes	No	11.2 ppb	80 ppb	0 ppb	By-product of drinking water chlorination
Chlorine (5)	No	Of the 249 chlorine residuals collected in 2009 with an approximate average of .40 ppm and a range of .11 ppm to .82 ppm	4.0 ppm MRDL	.2 ppm minimum at first customer in distribution system	Added at water treatment plant for disinfection

4) TTHMs (Total Trihalomethanes) & HAAs (Halo-Acetic Acids)

Some people who drink water containing Trihalomethanes or Halo-Acetic Acids in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

5) Chlorine

Chlorine is used as a water disinfectant. Disinfection is the most important step in the water treatment process to destroy pathogenic bacteria and other harmful agents. Chlorination is a very common and effective method for the disinfection of your drinking water. Your water provider is required to maintain a free chlorine residual throughout their water distribution system.

Questions or Concerns about your water?

For questions regarding this report or concerning your water, please contact Lake Whatcom Water and Sewer District, Water Treatment Plant Operator Kevin Cook at: (360) 734-9224. To learn more, please attend any of our regularly, bi-monthly Board of Commissioner meetings.

- Second Wednesday of each month at 6:30 pm
- Last Wednesday of each month at 8:00 am

Meetings are held at the District office at 1010 Lakeview Street. At the beginning and end of each Regular meeting, there is a public comment period where you may address any questions or concerns to the Board.

Cross Connections may be hazardous to your health

What is a Cross Connection?

A cross connection is any actual or potential physical connection between a potable (i.e., drinkable) water line and any pipe, vessel, or machine containing a non-potable fluid, solid, or gas where the non-potable substance can enter the potable water system by backflow. Garden hoses left connected and turned on when not in use can easily contaminate your home plumbing system. For questions or concerns about potential Cross Connections, please contact Lake Whatcom Water and Sewer District employee Randy Craker at: (360) 734-9224.

Do I have any obligations regarding cross connections?

Yes, if your residence has an in-ground irrigation system, heat pump, boiler or any other type of identified cross connection that requires a backflow prevention device, you are required to have the device inspected annually by a State Certified Backflow Assembly Tester.

REMEMBER: a cross connection not only threatens your health and safety, but that of your neighbors and the community as whole, so **PLEASE** do your part to prevent them.

Conservation

Inefficient and or leaking faucets, toilets, and excessive outdoor watering account for a significant amount of water that is treated at water treatment plants. Lake Whatcom Water and Sewer District would like to encourage voluntary water conservation and there are many simple ways to help in this effort. By installing water saving shower heads, kitchen and bathroom faucets and low flow toilets, an average residence could save 25% or more water a day then a residence without. We request voluntary even numbered addresses to only water outside on Tuesdays, Thursdays and Saturdays, and odd numbered addresses to water on Wednesdays, Fridays and Sundays, with no outdoor watering on Mondays. Lake Whatcom Water and Sewer District is a metered system, so saving water means saving money. Water may seem like an unlimited resource in the Pacific Northwest, but there is a limit, and it can only be plentiful for all future generations if we all do our part in conserving this precious resource.

Our commitment to our customers

Lake Whatcom Water and Sewer District staff is on duty around the clock to provide the safest and best quality water service to every home. We ask that all of our customers help us protect our precious water sources which are the heart of our community, our way of life, and our children's future.

Lake Whatcom Water & Sewer District

Annual Drinking Water Quality Report
Eagleridge Service Area
WA State ID# 081181

2009 CONSUMER CONFIDENCE REPORT

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Where does the drinking water come from?

Lake Whatcom Water and Sewer District purchases the water supplied to your home from the City of Bellingham and distributes the water in its own water distribution system to your tap. The City of Bellingham draws its water from Basin #2 of Lake Whatcom and pumps the water to its Water Filtration Plant where it undergoes filtration and disinfection. The water produced is a very high quality drinking water supply, and Lake Whatcom Water and Sewer District is pleased to report that the drinking water is safe and meets or exceeds all Federal and State requirements.

What's in the drinking water?

Lake Whatcom Water and Sewer District and the City of Bellingham routinely monitor the drinking water in accordance with Federal and State laws. Included are the results for five constituents that are regulated by the U.S. Environmental Protection Agency (USEPA) that were detected during the period of January 1st to December 31st, 2009. To obtain a complete listing of all constituents, please contact the District. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents and/or contaminants. It's important to remember that the presence of these constituents does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at: (800) 426-4791. In the following table you will find many terms and abbreviations you may not be familiar with. Abbreviations and terms used in this report include:

Parts per billion (ppb)

Parts per million (ppm)

Nephelometric Turbidity Unit (NTU) – Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

continued on next page

Action Level – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

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Maximum Residual Disinfection Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Contaminant Level Goal (MCLG) – The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Information for persons with compromised immune systems

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. United States Environmental Protection Agency and Centers for Disease Control (USEPA/CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the toll free Safe Drinking Water Hotline at: (800) 426-4791.

Facts About Detected Contaminants

1) Copper

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.

2) Lead

Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Elevated levels of lead in drinking water can cause serious health problems, especially for pregnant women and young children. In Bellingham, lead is not found in the treated water, but lead in drinking water can come from pipes and faucets in our customers' homes. Lake Whatcom Water and Sewer is responsible for providing high quality drinking water but cannot control the variety of materials used in customer's plumbing. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for at least 30 seconds before using the water for drinking or cooking. You can capture this water to use on plants. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at: (800) 426-4791, or online at: www.epa.gov/safewater/lead

3) TTHMs & Halo-Acetic Acids

Some people who drink water containing trihalomethanes or Halo-Acetic Acids in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems and may have an increased risk of getting cancer.

Testing is completed by Lake Whatcom Water and Sewer District and State certified laboratories.

Detected Contaminant	Violation Yes/No	2009 (or most recent) Level	MCL, AL or MRDL	MCLG	Likely Source of Contamination
Copper (1)	No	The 90th percentile value of 11 homes sampled showed copper at a level of 85 ppb	1,300 ppb	1,300 ppb	Corrosion of household plumbing, erosion of natural deposits, leaching from wood preservatives
Lead (2)	No	The 90th percentile value of 11 homes sampled showed lead at 0 ppb	15 ppb	0	Corrosion of household plumbing, erosion of natural deposits
TTHM (3) Total Trihalomethanes	No	Range of 17.4 ppb to 41.4 ppb with an average of 29.9 ppb	80 ppb	0	By-product of drinking water chlorination
HAAs (3) Halo-Acetic Acid	No	Range of 1.0 ppb to 18.2 ppb with an average of 12.7 ppb	60 ppb	0	By-product of drinking water chlorination
Turbidity (4)	No	0.23 NTU was the highest recorded at the city's plant	1.0 NTU	0	Soil Runoff
Chlorine (5)	No	Of the 249 chlorine residuals collected in the distribution system the average residual was approximately .30 ppm and a range of .11 ppm to .55 ppm	4.0 MRDL	.2 ppm minimum at first customer in distribution system	Added for disinfection at water treatment plant

4) Turbidity

Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headache.

(5) Chlorine

Chlorine is used as a water disinfectant. Disinfection is the most important step in the water treatment process to destroy pathogenic bacteria and other harmful agents. Chlorination is a very common and effective method for the disinfection of your drinking water. Your water provider is required to maintain a free chlorine residual throughout their water distribution system.

Questions or Concerns about your water?

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Cross Connections may be hazardous to your health

What is a Cross Connection?

A cross connection is any actual or potential physical connection between a potable (i.e., drinkable) water line and any pipe, vessel, or machine containing a non-potable fluid, solid, or gas where the non-potable substance can enter the potable water system by backflow. Garden hoses left connected and turned on when not in use can easily contaminate your home plumbing system. For questions or concerns about potential Cross Connections, please contact Lake Whatcom Water and Sewer District employee Randy Craker at: (360) 734-9224.

Do I have any obligations regarding cross connections?

Yes, if your residence has an in-ground irrigation system, heat pump, boiler or any other type of identified cross connection that requires a backflow prevention device, you are required to have the device inspected annually by a State Certified Backflow Assembly Tester.

REMEMBER: a cross connection not only threatens your health and safety, but that of your neighbors and the community as whole, so **PLEASE** do your part to prevent them.

Conservation

Inefficient and or leaking faucets, toilets, and excessive outdoor watering account for a significant amount of water that is treated at water treatment plants. Lake Whatcom Water and Sewer District would like to encourage voluntary water conservation and there are many simple ways to help in this effort. By installing water saving shower heads, kitchen and bathroom faucets and low flow toilets, an average residence could save 25% or more water a day then a residence without. We request voluntary even numbered addresses to only water outside on Tuesdays, Thursdays and Saturdays, and odd numbered addresses to water on Wednesdays, Fridays and Sundays, with no outdoor watering on Mondays. Lake Whatcom Water and Sewer District is a metered system, so saving water means saving money. Water may seem like an unlimited resource in the Pacific Northwest, but there is a limit, and it can only be plentiful for all future generations if we all do our part in conserving this precious resource.

Our commitment to our customers

Lake Whatcom Water and Sewer District staff is on duty around the clock to provide the safest and best quality water service to every home. We ask that all of our customers help us protect our precious water sources which are the heart of our community, our way of life, and our children's future.

LAKE WHATCOM WATER & SEWER DISTRICT

Annual Drinking Water Quality Report
South Shore Service Area
WA State ID# 959101

2009 CONSUMER CONFIDENCE REPORT

1010 Lakeview St.
Bellingham, WA
98229-2520
(360) 734-9224
www.lwwsd.org

Normal Business Hours:
8:00am to 5:00pm
Monday through Thursday
except Holidays

Emergencies:
360-734-9224 anytime

What is this report?

In accordance with the Federal Government's Re-authorization of the Safe Drinking Water Act of 1996, all public water utilities and companies are required to prepare and provide annual drinking water quality reports to their customers. As well as being required by Federal Law, we want to keep you informed about the excellent water and sewer services delivered to you over the past year. Our goal is to provide safe, dependable, and high quality drinking water.

Where does the drinking water come from?

The drinking water supplied to your home originates from Lake Whatcom, a surface water source. Lake Whatcom Water and Sewer District draws its water from Basin #3 of Lake Whatcom near Sudden Valley. The water enters our water filtration plant where it undergoes filtration and disinfection. The water produced is very high quality, and Lake Whatcom Water and Sewer District is pleased to report the drinking water is safe and meets or exceeds all Federal and State requirements.

What's in the drinking water?

Lake Whatcom Water and Sewer District routinely monitors its drinking water in accordance with Federal and State laws. Included are the results for six constituents that are regulated by the U.S. Environmental Protection Agency (USEPA) that were detected during the period of January 1st to December 31st, 2009. To obtain a complete listing of all constituents, please contact the District. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents and/or contaminants. It's important to remember that the presence of these constituents does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at: (800) 426-4791. Abbreviations and terms used in this report include:

Parts per billion (ppb)

Parts per million (ppm)

Nephelometric Turbidity Unit (NTU) – Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

continued on next page

Action Level – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Maximum Contaminant Level (MCL) – The "Maximum Allowed" (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs (see below) as feasible using the best available treatment technology. MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Maximum Residual Disinfection Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Contaminant Level Goal (MCLG) – The "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Information for persons with compromised immune systems

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. United States Environmental Protection Agency and Centers for Disease Control (USEPA/CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the toll free Safe Drinking Water Hotline at: (800) 426-4791.

Facts About Detected Contaminants

1) Chlorine

Chlorine is used as a water disinfectant. Disinfection is the most important step in the water treatment process to destroy pathogenic bacteria and other harmful agents. Chlorination is a very common and effective method for the disinfection of your drinking water. Your water provider is required to maintain a free chlorine residual throughout their water distribution system.

2) Nitrate

Infants below the age of six months who drink water containing nitrates in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.

3) Copper

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.

4) Lead

Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development, including slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Elevated levels of lead can cause serious health problems, especially for pregnant women and young children. In Sudden Valley and Geneva, lead is not found in the treated water, but lead in drinking water can come from pipes and faucets in our homes. Lake Whatcom Water & Sewer District is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for at least 30 seconds before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at: (800) 426-4791, or online at: www.epa.gov/safewater/lead

Testing is completed by Lake Whatcom Water and Sewer District and State certified laboratories.

Detected Contaminant	Violation Yes/No	2009 (or most recent) Level	MCL, AL or MRDL	MCLG	Likely Source of Contamination
Chlorine (1)	No	498 distribution system free chlorine residuals were collected in 2009 with a range of 0.22 ppm - 0.99 ppm, with an approximate average of .60 ppm	4.0 ppm (MRDL) maximum in distribution system	0.2 ppm minimum to first customer in distribution system	Added at water treatment plant for disinfection
Nitrate (2)	No	.39 ppm	10 ppm	10 ppm	Erosion of natural deposits, runoff from orchards, runoff from fertilizer, sewage, leaching from septic tanks
Copper (3)	No	The 90th percentile value of 28 homes sampled showed copper at a level of 173 ppb	1,300 ppb	1,300 ppb	Corrosion of household plumbing, erosion of natural deposits, leaching from wood preservatives
Lead (4)	No	The 90th percentile value of 28 homes sampled showed lead at a level of 4 ppb	15 ppb	0 ppm	Corrosion of household plumbing, erosion of natural deposits
TTHM (5) Total Trihalomethanes	No	Range of 10.2 ppb - 40.0 ppb with an average of 25.0 ppb	80 ppb	N/A	By-product of drinking water chlorination
HAAs (5) Haloacetic Acid	No	Range of 7.1 ppb - 16.6 ppb with an average of 12.1 ppb	60 ppb	N/A	By-product of drinking water chlorination
Turbidity (6)	No	0.04 NTU*	1.0 NTU	N/A	Soil runoff

5) TTHMs (Total Trihalomethanes) & HAAs (Halo-Acetic Acids)

Some people who drink water containing trihalomethanes or Halo-Acetic Acids in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

6) Turbidity

Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

**0.07 NTU was the maximum instantaneous operational level recorded, 0.07 NTU was the maximum hourly average recorded, 0.07 NTU was the maximum daily average recorded. The annual daily average was 0.04 NTU.*

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STEWARDSHIP SOLUTIONS

Protect Your Drinking Water

Lake Whatcom TMDL:
Maximum Pollutant Loads

A PARTNERSHIP OF WHATCOM COUNTY
CITY OF BELLINGHAM
LAKE WHATCOM WATER & SEWER DISTRICT

Protect Your Drinking Water

A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards

Total Maximum Daily Load

The TMDL looks at:

- pollution sources
- stressors
- recommended controls
- water quality conditions

to identify goals for pollution control and reduction within a watershed.

Lake Whatcom's TMDL

Water quality problems in Lake Whatcom have triggered a water quality improvement project by Ecology. These projects begin with a study of pollutants. For Lake Whatcom, Ecology is working to determine the allowable limits of phosphorus in the lake, and fecal coliform bacteria in the tributaries, to meet water quality standards. Ecology will work with local governments to determine how to achieve those limits.

Water Quality Issues

Lake Whatcom is on the state's 303(d) list of impaired water bodies. It is listed for total phosphorus as well as low dissolved oxygen levels due to high phosphorus levels. In addition, eleven of its tributaries have high fecal coliform.

Wondering what you can do? please see back

High Phosphorus Low Oxygen

Phosphorus occurs naturally, but development increases phosphorus entering the lake in stormwater. Computer predictions show the lake would meet state standards for oxygen with 86 percent less development than existed in 2003.

Excess phosphorus creates larger algae blooms requiring more treatment to make water safe for drinking. Excess algae combines with treatment chemical creating more trihalomethanes, a by-product that some studies link to cancer.

Bacteria

Fecal coliform bacteria originate in human and animal waste. Runoff carries the bacteria from the ground and failing septic systems into the lake. Eleven tributaries feeding Lake Whatcom fail to meet state standards for fecal coliform bacteria. The bacteria create a health risk for people who work or play in and around the water.

Protect Your Drinking Water

YOU CAN HELP!

Lawns and Gardens

- Fertilize only when necessary with a phosphorus-free fertilizer.
- Reduce the amount of grass in your landscape. Try native ground covers that require less mowing and fertilizer. Soil covered with plants acts like a natural sponge and filter, slowing down runoff and reducing the amount of pollutants that can reach the lake.
- Plant or leave vegetated buffers along streams, ditches, and lakeside property. If the property has been cleared, replant with native plants.
- Never leave bare soil exposed to rainfall.
- Make sure lawn clippings do not run off your property.

Your Car

- Take your car to a commercial car wash that recycles the water and then sends it to the wastewater treatment plant.
- If you must wash your car at home, wash it with phosphorus-free products on a suface that soaks up the water and prevents run-off
- Reduce car trips in and out of the watershed by combining errands, carpooling, walking, using public transportation, or riding a bike.

Waste

- Have your septic tank inspected and pumped every 3 to 5 years.
- Scoop the poop! Don't leave pet waste to decompose. Bag your pet's waste and place it in the garbage.

Soaps and Detergents

- When using soap or detergents outdoors make sure to use phosphorus-free products on a porous surface.

Resources and Links

http://www.epa.gov/OWOW/TMDL/intro.html

http://www.cob.org/services/environment/water-quality lake-whatcom.aspx

http://www.ecy.wa.gov/programs/wq/tmdl/LkWhatcom /LkWhatcomTMDL.htm

http://www.whatcomwatch.org/php/WW_open.php?id=973l

CONTACT:

Whatcom County Stormwater Division 360-715-7450
City of Bellingham Environmental Resources 360-778-7900
Lake Whatcom Water and Sewer District 360-734-9224

http://www.lakewhatcom.whatcomcounty.org